VETERINARY MEDICINE

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Report of the 56th Annual Meeting, United States Livestock Sanitary Association (Abstracts and notes of papers and committee reports)

Hog Cholera Immunization with a New Vaccine, Propagated *in vitro*, and Hog Cholera Antiserum

Plastic Fracture Sleeve

(Complete Index on Page VIII)

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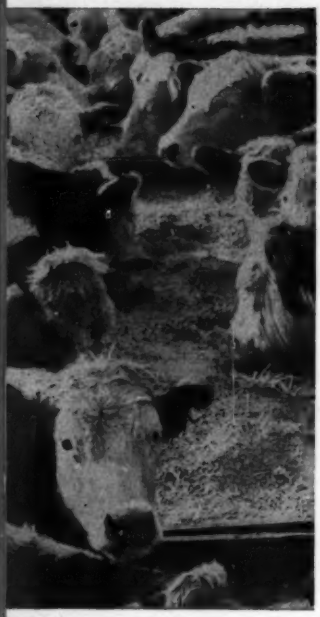

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Report Of The Fifty-sixth Annual Meeting, U. S. Livestock Sanitary Association, Louisville, Kentucky

REGULATIONS restricting movement of livestock because of Texas fever furnished the required impetus for the organization of this association. Operators of the Fort Worth Stockyards invited state veterinarians of a few midwestern states to visit them on September 27-28, 1897, to observe dipping procedures, said to relieve cattle of fever-bearing ticks. Out of this meeting grew the present organization, expanded to include livestock sanitarians from each state in the Union, representatives from United States possessions, and Canada.

An endemic disease, one of the oldest in recorded history, known by a variety of names in many countries of southern Europe, Asia, Africa, and South America, a piroplasmosis, commonly called Texas fever in North America, was largely responsible for bringing together those early animal disease control officials whose foresight set a course since followed. By strength of unity and purpose, accomplishments through the years have lent guidance for the eradication of Texas fever and other animal plagues. Disease and attendant problems continue to consume the interest of members of this group whose annual meeting makes possible discussions and orientation on many related subjects and exchange of views that subsequently direct all toward the objective of better livestock health. To state that a degree of uniformity in regulatory requirements of states exists is to say that they have a common purpose. Various influences brought about by needs, demands, location, etc., have resulted in differences. These are continually seeking a common level.

At this meeting, Dr. Ralph L. West, state veterinarian of Minnesota, presided as president. Louisville, Ky., was the host city, October 29-31, 1952, for the second time in the history of the organization; its fourth annual meeting in 1900 having been held there.

Officers for 1953

In selecting officers to serve for the ensuing year, the practice of recent years was followed of advancing vice-presidents in order; the first vice-president to president. No nominations were added to those submitted by the Nominating Committee and each officer was elected by motion instructing the secretary to cast one ballot for each nominee.

Dr. T. Childs, Veterinary Director General, Dominion of Canada, Ottawa, Ontario, was elected president of the U.S.L.S.A. for 1953.

Dr. T. Childs, veterinary director general, Dominion of Canada, Ottawa, Ontario, assumed the office of president; Dr. T. C. Green, state veterinarian of West Virginia, Charleston; Dr. Ivan G. Howe, chief livestock sanitary official of New York State, Albany; and Dr. H. F. Wilkins, chairman, Livestock Sanitary Board, Helena, Mont., the positions of first, second, and third vice-presidents, respectively. Dr. Ralph A. Hendershott, state veterinarian of New Jersey, Trenton, was re-employed as executive secretary.

Secretary-Treasurer's Annual Report

The secretary's report dealt in considerable detail with the problems presented by the outbreaks of infectious diseases among livestock in the United States during the past year. He referred to the large number of problems presented in his home state of New Jersey that suggested the inadequacy of present regulations. The fact was pointed out that the meat inspection laws were designed to protect the health and well being of consumers of meat and, that from an animal disease control viewpoint, they are little more than valueless.

Doctor Hendershott outlined what is needed and, to initiate the list, he mentioned that federal meat inspection regulations should be revised, that a change is desirable in the methods of marketing in yards, that an animal morbidity and mortality reporting system should be inaugurated and improvements made in quarantine measures, and, finally, that regulations should be passed to provide for cooking of raw garbage fed to animals.

Dr. T. C. Green, State Veterinarian, West Virginia, Charleston, was named 1st vice-president of the U.S.L.S.A.

Memorial Service

Dr. J. L. Axby, former state veterinarian in Indiana, Indianapolis, conducted the usual memorial service for the Committee on Necrology. The Association lost 18 members by death since the meeting in Kansas City in 1951. Among them:

Dr. I. S. McAdory died of a heart attack on July 5, 1952. He was past-president of the Association, having served in that capacity in 1942. He was also state veterinarian of Alabama during the war years. At the time of his death, Doctor McAdory was professor of veterinary medicine in the College of Veterinary Medicine at the Alabama Polytechnic Institute, Auburn.

Dr. James T. Burriss, of Columbus, Ohio, died suddenly on July 29, 1952. He will be remembered by those attending the post-convention meeting on anthrax, which was held at Atlantic City on June 26, 1952, on which program he took a prominent part.

Dr. George Rathman, of Topeka, Kan., who served as veterinary advisor to the livestock sanitary commissioner of that state, was stricken while attending the 55th annual meeting at Kansas City and died on November 13, 1951.

Dr. John R. Mohler, who for the past 40 years had been an active member in the Association and who served with distinction as its president in 1926, died on February 29, 1952. Doctor Mohler addressed the Association on numerous occasions; one of the most important of which was the report of the research by the Bureau on strain 19 *Brucella abortus* vaccine.

Dr. D. M. Campbell died at his home, Chicago, Ill., on March 27, 1952. Doctor Campbell was formerly secretary-treasurer of the Association having served in that capacity during the years 1919-1920. Doctor Campbell maintained an active interest in Association affairs up to the time of his death. His latest assignment was as representative to the Poultry Branch of the Production and Marketing Division of the U. S. Department of Agriculture.

Dr. Raymond L. Kelser, dean of the School of Veterinary Medicine, University of Pennsylvania, Philadelphia, and retired chief of the Veterinary Corps, U. S. Army, died of a heart attack while at work at the school. Doctor Kelser spent most of his professional life in the Army Veterinary Corps and headed the Corps during World War II. He was a member of the National Research Council and served on many important committees of the Association. He was particularly active in the interest of rabies control.

Dr. Jean V. Knapp, state veterinarian of Florida, Tallahassee, died on June 7, 1952, after a brief illness. Doctor Knapp will be remembered as the oldest member of the Executive Committee of the Association and for his years of continuous service. He served as president of the Association in 1948. He was appointed state veterinarian of Florida in 1922 and held that position at the time of his death.

Dr. H. J. Shore, vice-president, laboratory director of the Fort Dodge Laboratories, Fort Dodge, Iowa, died June 19, 1952 following a coronary thrombosis. Doctor Shore was associated with the development of the serum-virus method of immunization of swine against hog cholera. He aided in the development of the Virus-Serum Act of 1913. Doctor Shore maintained continuous membership in the Association for 40 years.

Proposed Changes in Organization

Changes designed to place more control in individual members were not adopted. Rather, the expression of the original designers of the constitution of the Association was held to serve best the purposes of this organization.

Legislation

The Committee reported that the legislation on rabies proposed in the report of the Rabies Committee for 1951 had not been introduced into the Congress. This committee recommended that the Association go on record endorsing such proposed legislation having to do with the participation of the United States Bureau of Animal Industry in rabies control in dogs.

It was also recommended that all states give consideration to the passing of adequate laws or regulations providing for the licensing of garbage feeders and the requiring of all raw garbage to be heat treated to temperatures sufficient to insure destruction of all viruses and, further, providing for the sanitary feeding of swine. It was suggested that the Bureau of Animal Industry and the Public Health Service be requested to promulgate regulations requiring all garbage to be sterilized prior to interstate movement.

Resolutions

The usual resolutions were adopted expressing the thanks of the Association to the hotel for the facilities provided to conduct a meeting and for suitable committee meeting rooms. The Jefferson County Veterinary Medical Association was also thanked for the party provided for visiting livestock officials. Likewise, the Louisville Chamber of Commerce was mentioned for services provided for registration, etc., and the management of Churchill Downs for remembering the membership by designation and running the sixth race on October 29 in honor of visiting livestock officials. Thanks were expressed to Dr. R. A. Hendershott for the fine services rendered the Association as the executive secretary.

Resolution was adopted by the Association condemning raw garbage feeding. Recommendation was made that states pass regulations requiring the cooking of all garbage fed and the registration and licensing of garbage feeders. Interstate movement of garbage, unless sterilized, was likewise condemned. There was also a resolution passed requesting the Secretary of Agriculture to declare a limited emergency for the eradication of scrapie in sheep. Prompt action was taken by the Secretary, as outlined in report appearing in VETERINARY MEDICINE for December 1952, page 518.

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There are about 400 garbage-feeding hog ranches in California.

Dr. F. R. Beaudette, New Brunswick, N. J., reported tests of a new textile bag sanitizing machine, developed according to recommendations made by him, to prevent transmission of poultry disease by means of used feed bags. These tests have revealed that vacuum cleaning of bags and subsequent exposure to jets of steam under pressure destroyed infectious agents used, including cultured virus of fowl pox and Newcastle disease, fowl typhoid organisms, and other agents.

Dr. R. A. Hendershott, State Veterinarian, New Jersey, Trenton, is the executive secretary of the U.S.L.S.A.

The 1952 Annual Report

Following the long established precedent of this journal, there appear on the following pages abstracts, notes, and summaries of papers presented during the three day session and reports of various standing committees. These represent the opinions expressed by speakers to whom they are attributed in so far as is possible from memory, a review of notes, and in some instances, access to copies of prepared manuscripts. Comments are those of the reporter who attended all meetings and made longhand notes of significant discussions. Contributions made at this meeting were of vital concern and interest to veterinarians.

This report will have failed its purpose if it does not infuse many with the desire for further investigation into the subjects, some read by title only at this meeting, which will appear as the Proceedings in the near future. Judged by standards of recent years, this paper-bound volume of between 500 and 550 pages will contain a wealth of information that represents the latest thinking on a variety of subjects.

Those interested in receiving a copy of the Proceedings are urged to order now from Dr. R. A. Hendershott, Secretary-Treasurer, 1 W. State Street, Trenton, N. J.

FOOT-AND-MOUTH DISEASE OUTBREAK IN SASKATCHEWAN, CANADA IN 1952

Abstract of paper presented by T. Childs, V.S., D.V.M., veterinary director general, Ottawa, Ontario, Canada.

In a discussion outlining the history of the foot-and-mouth disease outbreak in Saskatchewan, Canada, Doctor Childs emphasized the possible dangers of importation of disease virus on the personal effects, clothing, and shoes, of immigrants from Europe or elsewhere where disease among livestock is epidemic. The outbreak of foot-and-mouth disease in this mid-continent province of Canada was entirely unexpected. The scene of the outbreak seemed a most unlikely place for the disease to appear.

Foot-and-mouth disease, a classical example of an Old World disease which largely has been kept out of the United States and Canada, except for a few sporadic outbreaks, is an example of what might occur from a planned action of disseminating disease viruses. Doctor Childs stated that the outbreak in Canada last winter might have originated from either innocent or malicious introduction of the virus by an immigrant from West Germany. Investigation of the immigrant in question, who was mentioned in news releases during the early part of the year, revealed that he accepted employment on the dairy farm where the outbreak occurred, just 17 days after leaving infected premises in Europe. This suspicion was not confirmed by laboratory examination which, of course, was not made until a considerably later date. Doctor Childs stated that he was not entirely satisfied that this person might not have inadvertently transmitted the virus responsible for the outbreak from Western Germany to the premises in Canada from which it spread.

In the face of general disease of pandemic proportions in Europe and other foreign countries, and considering the rapid transportation possible for materials and individuals, great numbers of immigrants and visitors are coming and going from countries where infection exists into countries which are free; many arriving by air transport within 24 hours after leaving these infected areas. Under such circumstances, it is next to impossible to place effective barriers against the introduction of foot-and-mouth disease, as well as other diseases, on all avenues by which it may be introduced. In this regard, border officials must be ever alert and continually revise their methods and procedures for assuring against the possible introduction of foreign disease agents. This may involve the destruction of many things and the sterilization of others before allowing them to be brought inside quarantine barriers.

The speaker indicated that there were lessons learned from the foot-and-mouth disease outbreak on which the diagnosis was delayed, as follows: (1) that the disease is not nearly as formidable a foe as is generally thought; and (2) it can be wiped out quite readily if it is possible to follow a rigid policy of containment and eradication based on thoroughness in all phases of this work. A second lesson is that the actual work of eradicating disease is much less wearing and harassing than being exposed concurrently to the adverse publicity and criticism that were loosed on officials during the critical period of this outbreak.

The evident aspect presented was the manner of controlling movement of livestock, people, and products likely to carry infection. Quarantine procedures, disinfecting stations, procedures in cleansing and disinfecting infected premises, including infected packing plants, methods followed in the use of test animals, and a galaxy of other details taxed the capacity of the best plans of the well organized regulatory group. The cost of eradication of this rather limited outbreak in Canada, including compensation for condemned and slaughtered animals, was approximately $900,000.

To conclude his presentation, Doctor Childs showed a beautifully prepared, colored motion picture that graphically illustrated not only the severe weather conditions that were experienced in the northern province at the time, but also lesions of the disease among lots of animals. There were also pictured various operations such as cleaning premises, disinfection of cars and trucks, preparing pits for slaughtering and disposal of animals, refuse, and feed.

FOOT-AND-MOUTH DISEASE CONTROL AND ERADICATION MEASURES IN CANADA

Abstract of paper by J. F. Wells, V.S., D.V.M., chief veterinarian, Health of Animals Division, Department of Agriculture, Ottawa, Ontario, Canada.

The complexities of problems incident to outbreaks of foot-and-mouth disease were emphasized by Doctor Wells in a discussion of some of the details worked out for containment of the foot-and-mouth disease outbreak in Saskatchewan, Canada, early in 1952. Immediately when Canada was declared to be infected with foot-and-mouth disease on February 25, 1952, the principles of destruction and burial of all infected and contact livestock,

thorough cleansing and disinfection of all infected premises, with adequate investigation and quarantine measures to insure against possible spread of the disease were adopted. In total, there were 42 premises in the Regina area of the Province of Saskatchewan that were involved; 29 of which were infected and 13 contact premises. In the program for complete eradication, a total of 1,343 cattle, 294 swine, and 97 sheep were destroyed and buried.

The problem of destruction and burial of livestock during midwinter in the Canadian province was a difficult one, particularly from the aspect of mechanics. Difficulty in digging through 5½ feet of frost to prepare burial pits

Photo Courtesy USDA, BAI

Tongue and mouth lesions of foot-and-mouth disease in cattle

was overcome by the use of what are known as rippers or rutters. These heavy machines broke the earth into pieces small enough to be handled by scrapers. Dynamiting blew up chunks of the frozen gumbo too large to be handled by scrapers or bulldozers.

Doctor Wells spoke of the advantages of a respected police organization in the program of eradication. Officers of the Royal Canadian Mounted Police handled the shooting of live-

Photo Courtesy USDA, BAI

Foot-and-mouth disease lesion, interdigital space.

stock. These men were trained marksmen, they had the equipment, and, most valuable of all, participation of this group of public servants added prestige to the project. The Royal Canadian Mounted Police also were charged with maintenance of the three quarantine methods employed in this outbreak.

These were: (1) Individual quarantines were placed on infected or contact premises where livestock were destroyed and buried. This was the most severe quarantine. (2) A general quarantine was imposed on 21 contiguous rural municipalities in the province. These municipalities either had infected or contact premises within them or were in between municipalities which had infected or contact premises. These 21 quarantine municipalities comprised what was known as the infected zone, or more generally referred to as the quarantine area. (3) A general quarantine was imposed on 41 additional rural municipalities surrounding the quarantine area. This general quarantine was less severe than that imposed on the quarantine area. It was referred to generally as the buffer zone. While there were no infected or contact premises within this zone, a modified general quarantine was maintained in order to have the livestock surrounding the quarantine area under semi-control in case there was a jump of infection. In addition, whenever and wherever a strict quarantine line is drawn, there are bound to be border problems and situations arise which must be dealt with as exceptions to the general quarantine. Establishment and maintenance of the buffer area permitted the handling of these exceptional problems while still maintaining sufficient livestock control to protect against the spread of disease.

A relative degree of restriction of movements of livestock and personnel existed in these three quarantines. In the individual quarantine, animals were confined to the immediate vicinity of improvements on the premises (lots) and a lay inspector of the department was placed at the gate to enforce the quarantine. During this period, arrangements were made for the delivery of necessary supplies to the family and no movement was allowed off of the premises.

The quarantine area provided that livestock and livestock products, including meat, grain, and animal feed, were allowed to move within the prescribed zone. Royal Canadian Mounted Police were enforcement officers. Special squads were on continuous patrol. Permits for movement of all controlled livestock and livestock products, which were essential to the economy of the area, were granted where such movement did not endanger the disease eradication program and, in some cases, only after essential disinfection procedures had been followed. Free movement of milk and cream from farm premises within the quarantine zone to dairies within the quarantine zone was permitted. All trucks carrying such milk to the city of Regina had to pass through the department's central cleaning and disinfecting station after each trip from the country. Through movement of livestock by rail was permitted, provided such stock was not unloaded for feed or water in the quarantine area.

Quarantine in the buffer zone, which was actually the third concentric area surrounding the foci of infection, was designated to control the movement only of livestock and their products, with the exception of milk and meat. It should, however, be pointed out that any movement without a permit was only allowed within the actual buffer area. All movement from the buffer area to quarantine area or to

free areas was prohibited.

The speaker outlined many details that had to do with cleaning up of premises. Problems presented were the state of repair of many buildings, which were torn down if they could not be satisfactorily disinfected, the disposal of manure and foodstuff such as hay and grain, the handling of many time-consuming details having to do with the permit system which was enforced rigidly; all these plans being carried out under the most severe weather conditions. Suffice to say that these control and eradication procedures were successful and on August 19, 1952, just 170 days after the official declaration of infection, the Right Honorable J. G. Gardiner, Minister of Agriculture, declared Canada free of foot-and-mouth disease. At that time, all quarantine regulations were removed.

The United States Secretary of Agriculture had not rescinded the importation ban as of this date.

PRESENT STATUS OF THE COMPLEMENT FIXATION TEST FOR DIAGNOSIS OF ANAPLASMOSIS

Notes from a discussion prepared by William M. Mohler, D.V.M., and Daniel W. Gates, V.M.D., M.S., Pathological Division, Bureau of Animal Industry, U. S. Department of Agriculture, Washington, D. C.

The persistence of the infective agent in the blood of animals which have recovered from acute anaplasmosis results in these animals' becoming carriers of the disease for life. The most difficult aspect of this disease is the differentiation between the noninfected animal in a herd and the recovered or carrier animal; the latter being a constant source of infection. Herein lies a need for a diagnostic method in order to recognize these infective carriers.

Much work has been done in attempts to develop a complement fixation test and in the preparation of a suitable antigen. At present, tests are being applied to animals of known history, and information is being collected in regard to the efficacy of the test.

The complement fixation test is being successfully applied within limits that may be said to be comparable to those obtained in other infectious diseases. Limiting factor is the inability to produce a satisfactory antigen consistently. Variation in the titer of individual antigens further complicates the problem. Research is still in progress. As long as this problem of antigen production remains unsolved and until the difficulties are overcome, it will not be possible to test individual animals or herds of animals for the presence or absence of anaplasmosis with any satisfactory degree of accuracy.

Typical attitude in anaplasmosis. Accumulating evidence indicates increased incidence of this disease.

FEDERAL-STATE COOPERATIVE TUBERCULOSIS ERADICATION PROJECT

Notes from report presented by A. K. Kuttler, D.V.M., in charge of Brucellosis-Tuberculosis Eradication Division, BAI, USDA, Washington, D. C.

Tuberculosis in cattle has been reduced to the point that only one affected animal is now found in approximately 1,000 tested. This figure is based on the test results for 1952 in which there were 9,164,265 cattle tuberculin tested, with 0.11% reactors. The number tested for this year is greater than for any year since 1943 and the percentage of reactors is the lowest on record.

The goal of completing the project of tuberculosis eradication, which has meant much from the standpoint of more abundant and wholesome food supply, is in sight. Attention, however, is directed to the fact that there were almost 1,000 carcasses condemned for tuberculosis by the meat inspection service last year as unfit for human consumption. Work on this project must be continued until the job of eradication has been completed.

The Association has adopted the use of tuberculin in the cervical area in known infected herds. This method has been used in 18 states. In each of these, where tests have been made, lesion reactors have been disclosed which failed to react to injections of tuberculin in the caudal fold. Frequently, known tuberculous herds are not retested at the proper interval. There is no need to wait 60 to 90 days for a retest when tuberculin is applied in the cervical area.

Studies are reported to be continuing toward developing improved methods of detecting remaining infected herds. One valuable source

of information is, as indicated in previous reports, available through the federal meat inspection service. The greatest handicap, of course, to this method is the failure on the part of owners of livestock to mark their animals at the time they are marketed so that their origin can readily be traced from slaughtering establishment back to the farm or ranch.

Work is also continuing at the Department's laboratory in Denver, Colo., to which lesions thought to be tuberculous are forwarded for confirmation. As reported by Dr. C. L. Davis to the Association in 1951, almost half of the untested animals that were classed as tuberculous, on regular postmortem inspection were actually not tuberculous. Chronic conditions, with which tuberculosis may be confused include actinobacillosis, actinomycosis, coccidiogranuloma, other mycoses, and *Corynebacterium pyogenes* infection.

RESULTS OF COMPARATIVE TESTS OF BRUCELLOSIS MUCOID "M" AND STRAIN 19 VACCINES

Notes from a discussion presented by B. H. Edgington, D.V.M., Wooster, Ohio.

Results of limited tests, including three groups of animals, confirmed reports of previous investigations of the relative value of Huddleson's Brucella "M" vaccine as compared with BAI strain 19. Combining results of the three tests made in Ohio, the average percentage rate of the resistant animals was 90.9% for strain 19 vaccinates, 52.1% for the "M" vaccinates, and 17.3% for the nonvaccinated control. In other words, "M" vaccine is not entirely devoid of immunological value, but the immunity conferred rests somewhere between that induced by BAI strain 19 and nonvaccinated controls.

It would appear from the information reported that the "M" vaccine may find a field of utility, even though its protective value, as demonstrated in the tests reported in Ohio, is below that of strain 19. This field would be particularly in noninfected, adult breeding animals and those furnishing milk to markets that require the product to originate from agglutination negative animals. Agglutination response in negative noninfected animals may reach a low reaction titer when animals are vaccinated with "M" vaccine, which disappears in both calves and adults within 30 to 100 days.

The speaker wisely commented that the fact continues to remain apparent that present vaccinal use can be accepted only as an adjunct to the problem of brucellosis control in cattle.

ANTHRAX IN LIVESTOCK IN THE UNITED STATES AND ITS CONTROL

Abstract from an address by C. D. Stein, V.M.D., U. S. Bureau of Animal Industry, Department of Agriculture, Washington, D. C.

One of the oldest diseases recorded in history takes a significant toll of American livestock annually.

Anthrax, also known as splenic fever, and referred to by Louisiana cattlemen as charbon and in Africa as miltsiekte, probably causes more consternation and apprehension among livestock growers than any other disease known in America today. In a sense, it may be said that this disease is "sudden death." It strikes a herd suddenly, spreads rapidly, and takes a heavy toll unless adequate protective measures are taken to prevent its spread.

Historically, anthrax is one of the oldest diseases recorded in history. It was the first disease of man and animals shown to be caused by a microscopic organism. Demonstration in France by Pasteur nearly 75 years ago and now considered classical, was one of the outstanding scientific contributions up to that time. Although we think of anthrax as having dated from Pasteur's experiments, the disease has probably existed from the remotest time. In this regard, its nature remained almost entirely obscure until rather recent years.

Anthrax has existed in certain areas in the United States for as long as livestock have been maintained in concentrations. In these areas, annual vaccination has controlled the infection which actually exists in the soil of these regions. Considering the peculiar characteristics of the causative organism and the fact that certain stages of it are resistant to environmental influences, little has been accomplished in the matter of control other than vaccination of susceptible stock. This resistant stage, spores, remains dangerously infective in the soil for many years. Spores may be brought to the surface by heavy rains, erosion, floods, etc., thus contaminating grasses. These are capable of inducing infection in susceptible animals that graze on such contaminated forage.

Early in 1952, considerable concern developed after numerous outbreaks of anthrax occurred in swine in a number of midwestern states. These outbreaks did not follow the course expected. The disease did not spread rapidly among swine in infected droves, nor did it, in many instances, spread to stock ordinarily considered susceptible on the same premises, such as cattle, sheep, horses, and mules. Losses were small for several reasons.

Sick animals responded to treatment. Serum and penicillin did much to prevent loss. The source of these outbreaks was considered to be due to contaminated feed, some of which was imported. Since these experiences, adjustments have been made in quarantine regulations that will prevent possible importation of improperly sterilized material, such as bonemeal.

Doctor Stein has devoted many years to the study of this ageless malady. He admits that the course does not always follow the lines it has been known to follow in the past. In other words, it, like many other diseases, is undergoing gradual change in character. These are matters that concern livestock health authorities who must be alert to such trends and the change in character of infectious diseases; particularly those that are responsible for human disease or that are transmissible between animals and man.

EXPERIENCES WITH HOG CHOLERA VACCINE

Abstract of paper presented by W. L. Sippel, V.M.D., Department of Animal Diseases, Georgia Coastal Plains Experiment Station, Tifton, Georgia.

Hog cholera has been present in the United States for 120 years. It first appeared in this country in Ohio in 1833 and soon spread throughout the nation. The disease remained unchecked for 75 years when the serum-virus method of vaccination was developed by Bureau workers in Iowa. This occurred within five years after the report of deSchweinitz and Dorset that the disease was caused by a virus.

The next step in the development of protective agents was, of course, the perfection of tissue vaccines. In 1933, Boynton developed what was named Boynton's tissue vaccine (B.T.V.), which was followed shortly by the introduction of crystal violet vaccine (C.V.V.). Since the perfection of these inactivated vaccines, it has been possible to eradicate cholera in this country. However, other than brief suggestion of the idea by certain veterinarians and some farm magazine publicity, the eradication idea was not translated into action until a committee was appointed at Phoenix, Ariz., in 1950, by the United States Livestock Sanitary Association, then in annual convention in that city. This committee was charged with the responsibility of investigating the possibility and formulating the means by which hog cholera could be eradicated in the United States. Their report, presented at Kansas City, October 1951 (see VETERINARY MEDICINE, 47:17 [Jan.], 1952), was creative and made the assertion that eradication was possible in this country under certain specified conditions.

While B.T.V. and C.V.V. can immunize pigs against cholera for approximately one year, these products have had certain serious drawbacks. The principal one of these was that they required two or three weeks to develop an immunity and because they could not be used in exposed pigs, as the simultaneous use of these with serum did not result in protective immunity. When immunity induced by this vaccine was compared with the extremely durable immunity engendered by serum and virus, the vaccines were noted to be weak, although immunity conferred withstood the usual type of field exposure.

In the summer of 1951, new modified vaccines were reported. Accounts of tests on these products were glowing. It appeared certain at the time and substantial field experience since has shown that the use of modified antigenic vaccines is therapeutically sound. Losses from all causes in vaccinated droves is reported elsewhere in this issue to approximate 1%. It was hoped that they would be ideal immunizing agents and produce an immediate, solid, and long-lasting immunity without danger of overreaction or spread of cholera to other insusceptible pigs. With publicity given these products and the agitation for eradication of hog cholera, there was developed an insistent demand by hog raisers, and the new vaccines enjoyed wide acceptance by the profession as well as swine growers. Over 9,000,000 doses of hog cholera vaccine were sold during the 11-month period between July 1951 and June 1952. Most of these were probably of the modified virus type.

As was to be expected, a few trouble cases developed with use of these vaccines. These problems occurred as vaccine over-reactions and failure to develop protective immunity. Reasons for the trouble were not always apparent, but in most instances, proved to be failure of proper selection of swine for immunization. As all pigs presented for vaccination do not meet the health standards demanded by manufacturers of biological products and which practitioners prefer, certainly a dose of serum given to these pigs, along with whatever vaccine is used, appears to assist animals in withstanding any potential over-reaction and, furthermore, confers immediate immunity. All manufacturers of the modified vaccines at the present either require that serum be used with their product or indicate that it can be used with it if desired.

Doctor Sippel stated that from a resume of the occurrences referred to in his paper the

suggestion is apparent that practitioners must bear in mind that the new vaccines are live viruses. They must be used with the same care that serum and virulent virus are used to prevent postvaccination difficulties. It is quite apparent that the new vaccines have been used where the practitioner has been afraid to use serum and virus. There possibly has been a tendency, subconsciously, to place the new vaccines in the category of inactivated vaccines (B.T.V. and C.V.V.) rather than in the group with serum and virus. It should be emphasized that although new products are modified viruses, they have not been modified to the point of inocuity. The same care should be taken in their use as regards the health and condition of hogs to be treated as is taken with serum and virulent virus. The experiences reported in Iowa, Georgia, and other locations may indicate that further attenuation of the viruses in the production of these vaccines is desirable if it can be done without the sacrifice of adequate antigenicity.

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CONDEMNATIONS AT SLAUGHTER FOR TUBERCULOSIS

Notes from an address by J. R. Pickard, D.V.M., general manager, Livestock Conservation, Inc., Chicago, Illinois.

Early in the campaign to eradicate bovine tuberculosis, some records were accumulated having to do with the percentage of carcasses condemned for tuberculosis in federal-inspected plants. In 1921, one of eight hogs, or 12.4%, were retained because of tuberculous lesions observed at slaughter. The peak of retention of swine was 15.2%. This was reached in 1924, and since that date, there has been a gradual decline to an average of 4.4% for 1952.

Cattle retentions have been similarly decreased. One out of 60 carcasses was retained for tuberculous lesions in 1921 for a percentage of 1.62. The downward trend to 0.026% in 1952 is testimony to the efficiency of the tuberculosis eradication campaign and to the credit of regulatory officials, veterinarians, and others who participated.

Doctor Pickard emphasized the necessity for better means of identification of carcasses. He cited a number of instances that demonstrated the difficulty of tracing the source of animals discovered to be tuberculous, on the killing floor. He also referred to the type of infection most common in swine. This is noted to be of the avian type and the much recommended procedure of maintenance of all pullet flocks was pointed out to be an important control measure of this disease of hogs.

INFECTIOUS ATROPHIC RHINITIS IN OHIO

Abstract of paper by Ray S. Smiley, D.V.M., Ohio State Department of Agriculture, Division of Animal Industry, Columbus.

A consciousness of the seriousness of atrophic rhinitis in swine is serving as a stopgap until further information can be obtained regarding management in the event of outbreaks of this disease. Breeders are cautioned to exercise critical judgment in both sales and purchases to minimize further spread.

Atrophic rhinitis. Markedly affected with practically complete disappearance of nasal turbinates, revealed by cross section of head immediately posterior to last molars. There was no deviation of the snout in the case illustrated. Photo courtesy of Dr. W. W. Wempe, Lawrence, Kan.

The increasing prevalence of atrophic rhinitis suggests the vital need for a serious study and a thorough understanding of the causative agent or agents. The insidious nature of the condition, as well as the serious economic effect, have caused many breeders to suspend swine breeding and feeding operations temporarily.

Since the time that this disease was recognized as an entity, spread has been rapid. Observations in Ohio have indicated that one breeding plant has been responsible for infection on as many as 50 farms. This is understandable when it is appreciated that one or two years are frequently necessary for the disease to attain full significance or even be recognized. Thus, the malady may exist on a farm for at least two years before the owner realizes that his herd is infected.

The usual story is that a boar of unknown history is purchased and used to sire litters

from home raised gilts. The first progeny do not reveal evidence of infection during any time to marketable size and weight, although the owner may notice a few individuals that have crooked snouts. The second breeding year, gilts retained from the herd will produce progeny that are seriously affected. Symptoms develop within the first three weeks after pigs are born. Sneezing and coughing may or may not be accompanied by nasal discharge. Pneumonia develops within a week or ten days in some cases. General unthriftiness, rough hair coat, diarrhea, and consequent emaciation are frequent sequelae. Death rate at this stage may be as high at 20 to 30%; the losses usually due to the development of secondary pneumonia.

A recent survey in Ohio, interrupted late last spring because of anthrax, was made in an effort to understand better the expected course of infection. In December 1951, a breeder of purebred Hampshire swine informed state regulatory officials that he believed the disease was present on his premises and that he had been guilty of unwittingly selling affected gilts. At the same time, he indicated his desire to cooperate in any manner which might disclose how the disease was introduced into his herd. Records indicated that the first symptoms of atrophic rhinitis were noticed in 1948. These occurred in feeding shoats of five or six months of age and were characterized by crooked, distorted snouts, which were believed to be a form of bull nose. Approximately 5% of this group were affected. On this farm, it is a common practice to maintain approximately 20 breeding sows and retain 20 to 30 gilts, as well as three boars for herd sires. In 1949, a small percentage of pigs farrowed were noted to have distorted snouts. Fewer were observed to tilt their heads. These usually became very thin and eventually died.

Continuing the practice of keeping older sows and selecting gilts from the spring crop of pigs, two years elapsed, until the spring of 1951, at which time 20 older sows and 20 of the bred gilts developed nosebleeds. This condition was observed first about a month before farrowing. Good sized litters were farrowed, but from two weeks to weaning time, an average of 10% of the pigs became thin and died. From weaning age to three months, the shoats were slow but appeared to be growing well. At four to six months, these hogs again became noticeably unthrifty and rough. February farrowed pigs were slaughtered in September at 210 lb. weight. During this period, two or three hogs of the lot, ranging from 150 to 240 lb., were found dead each day. During the fall farrowing period, nosebleeds were observed in gilts and sows at farrowing time. Then at ten days to two weeks of age, pigs appeared to be drying up and dying at the rate of four or five per litter. In a summary of operations for 1951, the breeder estimated his loss at 30% between farrowing and weaning time, or a loss of approximately 100 pigs. The remaining pigs were about half the normal size customarily experienced on his farm.

In addition to the survey on this breeding farm, a check was made on those premises where breeding gilts and boars had been sold. In each of these, troubles were experienced after the introduction of infected animals and some growers had disposed of their entire herds.

It is understood that research activities are to be intensified on the problem aspects of atrophic rhinitis. The threat of the disease is not alone an economic factor because of its spreading and the fact that it is responsible for death losses, as well as restricted weight and growth gains, but is a threat to the entire swine industry. In some sections of the Corn Belt few purebred ranches are free of infection. It is conceivable that if allowed to progress, infectious rhinitis may well be the concern not only of the grower of swine but to the consumer as well, and especially to practitioners.

The disease is actually threatening the supply of meat. Management must hinge on cause and, until etiology can be proved, little progress will be made other than assurance given that good management practices tend to hold losses to a minimum.

ADMINISTRATIVE CONSIDERATIONS OF RAW SWILL FEEDING OPERATIONS

Abstract of paper prepared by R. E. Shope, M.D., D.V.M., research specialist, virus disease, Rockefeller Institute for Medical Research, New York, New York, Oscar Sussman, D.V.M., M.P.H., chief, Bureau of Veterinary Public Health, State Department of Health, Trenton, New Jersey, and R. A. Hendershott, D.V.M., director, Division of Animal Industry, State Department of Agriculture, Trenton, New Jersey.

Many instances may be cited to support the hypothesis that prevention, control, and eradication of trichinosis, vesicular exanthema, foot-and-mouth disease, and certain other diseases of swine, including hog cholera, depend on the elimination of raw garbage feeding operations.

Failure to face these facts by realistic action is not understandable. As the matter stands, a small segment of the swine industry imperils the entire agricultural economy of the nation. In addition, and of serious moment, are the public health aspects and the threat to reduced

food supplies. Further, the concern of civil defense authorities regarding the practice of feeding raw garbage, is genuine in view of the confusion that recent outbreaks of vesicular exanthema have caused and its marked similarity to foot-and-mouth disease. The implication here is that cattlemen have a vital interest since coexistence of these vesicular diseases might mask symptoms of foot-and-mouth disease in early stages, which conceivably would allow

Dr. Jacob Traum

Doctor Traum was the first to point out differentiating characteristics of vesicular diseases. He proposed the name, vesicular exanthema, since applied to a disease of garbage-fed hogs indistinguishable clinically from foot-and-mouth disease.

rapid spread of infection. This would place the cattle industry as well as swine culture in jeopardy.

The garbage feeder cannot be expected to take initiative, since his has generally been a lucrative operation in spite of recurring disease storms. He is generally not appreciative nor concerned with the disease-spreading potential he harbors.

The practice of feeding garbage to hogs has developed through the years principally in areas adjacent to great cities. The reasons are obvious. Hotel, restaurant, hospital, other institutions, and even household garbage, contains valuable and cheap food ingredients which hogs will eat. It has the advantage of recovering food from what would otherwise be waste. It has also answered a problem of low cost disposal for municipal authorities.

Present regulations governing the interstate movement of garbage have not been enforced and would be ineffectual if imposed without integrating other vital aspects of the problem. In New Jersey, for example, garbage feeding occurs almost exclusively in two areas of the state. Garbage fed is obtained largely from collections in New York and Pennsylvania. Vesicular exanthema was spread from garbage containing pork scraps from inspected and passed hog carcasses, cuts from which were purchased for consumption by passengers of a transcontinental train. Interstate movement of garbage and live animals fed raw garbage and fresh or frozen products derived from them is virtually unrestricted.

Public Health Hazards

Studies conducted by various agencies, including the U. S. Public Health Service, have shown that the incidence of trichinosis is higher in raw garbage-fed hogs than others. Authorities in human medicine report an infection rate in man, as obtained from studies of the diaphragms of human cadavers, to be higher in the United States than in any other enlightened country.

Another important fact is the experimental demonstration that trichina larvae can serve as the intermediate and transmitting host for lymphocytic choriomeningitis virus.

Promulgation of disease by movement of raw garbage fed hogs or pork derived from them is potentially dangerous. It is vital to the swine industry that federal and state cooperative action be set in motion at the earliest possible date, that laws be passed and that regulations be clearly set forth and enforced by: (1) prohibiting the interstate movement of hogs fed raw garbage and products derived from them, as well as the movement of raw garbage; (2) providing for licensing garbage feeders, disposal of garbage, offal, and other disease-dangerous refuse, restricting movement of hogs so fed to specifically designated slaughter houses; and (3) setting up inspection service to assure such provisions are carried out.

PREPARATION AND TESTING OF CLOSTRIDIUM PERFRINGENS TYPE D BACTERIN

Synopsis of a paper presented by G. C. de Mello, B.A., J. Clemente, M.S., J. S. Kiser, Ph.D., J. H. Williams, Ph.D., Pearl River, New York.

Enterotoxemia is an important cause of economic loss to sheep raisers. It is believed to be due to formation of epsilon toxin by *Clostridium perfringens* type D in the intestine and its subsequent absorption. Immunization of lambs with alum-precipitated toxoids of type D *Cl. perfringens* has been effective in preventing the disease.

A method of preparing a highly antigenic toxoid was presented in detail, together with a satisfactory method of testing the potency of the product by means of measurement of the combining power of the bacterin for a specific antiserum. A discussion of the variable to be controlled was included.

Finally, data were presented to show that a substantial antitoxin titer is induced in sheep immunized with a single dose of toxoid of high titer.

HEAT TREATMENT OF GARBAGE TO CONTROL DISEASE

Abstract of paper by Charles C. Johnson, Jr., B.S., C. E., senior sanitary engineer, Division of Sanitation, Public Health Service, Federal Security Agency, Washington, D. C., and J. Dewey Long, B.S., M.S., research agricultural engineer, Bureau of Plant Industry, Soils and Agricultural Engineering, USDA, Washington, D. C.

The U. S. Department of Agriculture estimated in 1941 that 200,000,000 pounds of pork could be produced annually if all the garbage produced in the urban areas of the United States were utilized for hog feeding. This is to say that garbage has definite economic value and is not merely waste.

The writers state that collection and disposal of garbage is costly and that beneficial uses are limited. The greatest economic value is its use as hog feed; less returns are derived when such material is utilized as sanitary landfills, or production of soil conditioner through composting.

Raw garbage has been found to serve as a carrier of parasites and microorganisms dangerous to both man and animals. Undeniable proof has been presented that untreated garbage is a common method of spreading vesicular exanthema, hog cholera, foot-and-mouth disease, trichinosis, and others. Rendering such food safe by sterilization offers a practical method of control of disease transmitted by raw garbage and, at the same time, preserves the value of the material for the production of human food.

In addition to the added cost of cooking garbage, frequent objection to the practice is that hogs fed treated swill fail to make gains equivalent to those fed raw garbage. Feeding trials in California fail to substantiate this objection. Simple heat treatment, by the introduction of steam to an open container, was most satisfactory from the standpoint of food value of the product. Hogs maintained on garbage cooked in this manner made gains equal to those fed raw garbage derived from the same sources. Abundant testimony is also available under field conditions where feeders now cook all collected hotel and restaurant kitchen wastes.

There was distributed to members a mimeographed pamphlet entitled, Equipment for Heat Treatment of Garbage to be Used for

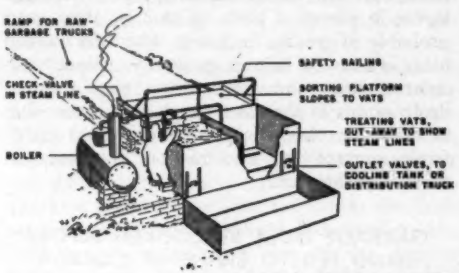
RAMP FOR RAW-GARBAGE TRUCKS
CHECK-VALVE IN STEAM LINE
BOILER
SAFETY RAILING
SORTING PLATFORM SLOPES TO VATS
TREATING VATS, CUT-AWAY TO SHOW STEAM LINES
OUTLET VALVES, TO COOLING TANK OR DISTRIBUTION TRUCK

Diagram courtesy USDA and USPHS

Preparation of garbage for feeding swine by wet-steaming or boiling in an open vat. In this system, live steam is introduced into the bottom of the vat. Hogs fed garbage cooked in this manner made gains equal to those fed the raw product obtained from the same sources.

Hog Feed. This is a collection of available data and the evaluation of various methods derived by experience relative to equipment and procedures for the disinfection of garbage. It was issued jointly by the U. S. Department of Agriculture and the Public Health Service.

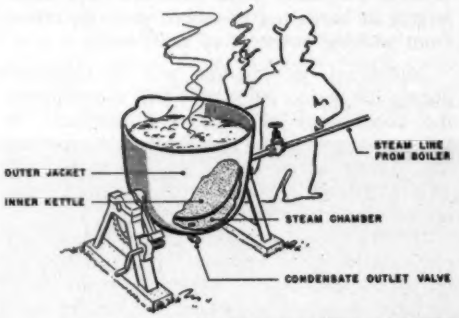

Diagram courtesy USDA and USPHS

Dry-steaming or boiling in a jacketed kettle. This system eliminates the water that would otherwise be added by the condensation of steam. Moisture content is virtually unchanged.

Methods discussed included:

1. Heating with steam: (a) wet steaming, or boiling in an open vat; (b) dry steaming, or boiling in a jacketed kettle or cylinder; (c) steaming in a pressure cylinder.
2. Direct heating over an open fire.
3. Dehydration.

Accompanying diagrams illustrating methods have been selected from those appearing in the pamphlet referred to above.

Time-temperature requirements for satisfactory sterilization have been the object of research. These have been primarily concerned with trichinae. Results justify the conclusion that boiling garbage for 30 minutes in an open container will effect destruction of trichinae larvae in pieces of pork up to 3 in. thick, and probably of greater thickness, when the cooked mass is allowed to coöl gradually. Since vesicular diseases and some others have thermal death points in the same range, it is reasonable to conclude that this procedure would effectively prevent the transmission of most diseases that threaten.

GARBAGE MUST BE COOKED BEFORE BEING FED TO SWINE IN CANADA

Notes from an address by Orlan Hall, V.S., D.V.M., assistant veterinary director general, Dominion of Canada, Ottawa, Ontario, Canada.

The speaker reviewed the situation that led to the regulations governing garbage feeding of swine in Canada. He cited a report of the veterinary director general, the late Dr. J. C. Rutherford, made after a survey in 1903. At this time, it was stated that outbreaks of cholera were occurring largely in swine herds that were being fed garbage and hotel swill. From the period 1903 to 1909 a number of cholera outbreaks were recorded and these largely in herds fed uncooked garbage, refuse from packing houses, and hotel swill.

Additional information was accumulated during the period 1909-1916 that substantiated the conclusions of Doctor Rutherford. A regulation governing the feeding of garbage was placed in effect during the fiscal year ending March 31, 1916. It has since been amended and at present is stated as follows:

"Unless special permission in writing is first obtained from the veterinary director general, no person shall feed to swine or permit swine to have access to or to be fed on his own premises or on the premises of any other person, corporation, or municipality, any garbage, raw or cooked, composed of any of the following; namely, meat scraps, garbage, kitchen waste, fruit and vegetable refuse, or other matter edible by swine and which has been obtained elsewhere than on the premises where fed or from any hotel or restaurant."

It is obvious that the law in Canada prohibits the feeding of collected garbage to swine unless the owner first has in his possession special permission in writing, which is in the form of a license, granted under the authority of the animal contagious disease act and the regulations made thereunder. Applications for license to feed the garbage to swine must be on a form provided for that purpose. The owner must agree in writing: (1) To boil thoroughly all garbage before feeding it to swine and to prevent swine from having access to uncooked garbage; (2) to maintain swine in a clean, sanitary condition; (3) to sell no hogs except for immediate slaughter; (4) to notify the veterinary director general without delay whenever sickness appears among swine.

The cost of eradication of hog cholera in the last year in which outbreaks are recorded was indicated by McNutt (*Vet. Med.*, 46:411 [Oct.], 1951). In that year eradication of hog cholera in Canada cost $600. "while the mere control in the United States during the same year cost between $30,000,000. and $40,000,000."

Apart from the aspect of hog cholera control, it is obvious that cooking of garbage is a major factor in preventing dissemination of other virus and parasitic diseases of livestock and poultry which are of economic importance to livestock producers, as well as being a public health matter important to the nation as a whole.

There is no thought in Canada of relaxing regulations in connection with the feeding of collected garbage to swine, without adequate cooking. It is not considered by livestock officials there that they can take the risk of introducing diseases through the medium of garbage, to Canadian livestock. The facts and figures in reference to hog cholera control in this country give further substance to that opinion.

OUR NEWER KNOWLEDGE OF BOVINE HYPERKERATOSIS (X DISEASE)

Abstract of paper presented by A. M. Lee, D.V.M., M.S., Pathological Division, Bureau of Animal Industry, Agricultural Research Administration, United States Department of Agriculture, Washington, D. C.

The program instituted in 1949 for the investigation of bovine hyperkeratosis (X disease) is an outstanding example of the possibilities for cooperation among many research agencies now set up in the United States. In this instance, the Bureau of Animal Industry is not doing investigational work at the Beltsville station. They have set up in the Bureau coordinating personnel who have assisted in assigning projects among interested state and regional experiment stations that wish to devote study to various phases of the problem. As returns from this investigational work have come in, Dr. A. M. Lee, who is the national

coordinator of this research project, has assembled the material and organized it. As facts were developed, circulation was given to all interested in the study of the cause, pathology, and other phases of the disease process.

For the past ten years, many research workers believed that hyperkeratosis was an infectious disease caused by a virus. It has been reported from 35 states. The toll taken has been more in losses of weight and condition, although, in some instances, death losses have been suffered. To date, a number of causes of the disease have been revealed. Most of these concern the intake of toxic products, which is contrary to the original hypothesis.

Doctor Lee presented his paper to outline the present status of research accomplishments and to report the progress of various state agricultural experiment stations. Nothing has been found that has any value as a treatment or therapeutic agent as long as infected animals continue to be in contact with or take in responsible toxic factors. If, however, these toxic factors are removed while the appetite remains and before complicating pneumonia or other secondary infections develop, many animals recover under good animal husbandry practices. These toxic products have included a wood preservative, certain lubricants, a particular lot of hay, feeding pellets, and a processed concentrate or fractions of it. (See VETERINARY MEDICINE, 47:479 [Nov.], 1952.)

If, over a period of sufficient time, bovine hyperkeratosis-producing material is taken in with the feed, is sprayed or otherwise placed so that animals may come in contact with it, is given in capsules, by stomach tube, or placed directly in the rumen through rumen fistula, there develop systemic symptoms before skin changes appear. The most common ones include listlessness, depression, excessive secretion of tears which often keep the hair wet below the eyes, drooling of saliva, a watery discharge from the nose, and loss of flesh. A rapid drop in plasma vitamin A, often to very low levels, has been found by some workers. There also often develop loss of condition, emaciation, a variable appetite, intermittent diarrhea, a dry, scurvy skin, and raised proliferated areas or wart-like lesions on the floor of the mouth, on the dental pad, hard palate, lips, tongue, gums, and side of the cheeks. Lesions have also been found on the muzzle, margin of the nostrils, and in rare cases on the mucosa of the esophagus. If the calf survives the systemic effect and does not die from secondary bacterial infections, pneumonia or enteritis, typical skin hyperkeratosis slowly develops, provided enough of the toxic material is received. Experimentally produced cases and a few others commonly show cystic swellings on the mucosa of the gall bladder, the hepatic duct, cystic duct, common bile duct, and large bile duct.

Specific recommendations for handling X disease must await further information, which is certain to be uncovered. Once this knowledge is available, it may be possible to remove causative agents from materials which cattle are fed or to which they are exposed and which may be responsible for manifestations

Photos courtesy Dr. Frederick R. Stanton

Skin lesions of hyperkeratosis (X disease) on the head and neck of an eight-month-old calf. At the right is close-up view of the costal region of the same calf.

of the disease condition. A case in point is that in which certain lubricants have been shown to produce the disease when cattle were exposed to them.

ROLE OF ANIMAL DISEASE REPORTING IN PUBLIC HEALTH

Abstract of paper presented by L. Otis Emik, Ph.D., Communicable Disease Center, Public Health Service, Federal Security Agency, Atlanta, Georgia.

The U. S. Livestock Sanitary Association has concerned itself with animal morbidity and mortality since its inception. A committee has been functioning for a good many years, struggling with the task of developing a reporting service from which an analysis could be made with reference to morbidity and mortality of livestock. Progress has been painfully slow because of the indifference of many regulatory officials, as well as practicing veterinarians. Some change has occurred and today most favor some method by which comprehensive statistics might be available.

In Europe, general systems of reporting animal diseases have been in operation for many years. No comprehensive system now exists in the United States, although a number of exploratory projects are in operation in a number of states, some with emphasis only on diseases having public health significance; others encompassing all animal diseases of a contagious nature. Examples of these efforts are those now operating in Indiana and Missouri.

Human morbidity reporting has been developed in the United States for over 30 years in the public health departments as one of their regular functions. These reports are sent through established channels of the state health departments. Information collected is submitted by the states to the National Office of Vital statistics every Tuesday by telegraphic report. Data are summarized and promptly distributed to the nation for immediate use. County breakdowns are sent in by mail along with corrections for detailed tabulation analysis. The mere collection of this information is just the beginning. There are many things which are done routinely by public health officers and those included in the organization that are emphasized by the results of surveys of the data supplied. Local health officials use them to establish quarantine. Public health nurses base their surveyance and routine visits on them. Probable existence of epidemic conditions requiring state and federal investigation and action is detected by analysis and examination of summarized figures. It is clear that a satisfactory morbidity reporting system really becomes a complete disease intelligence service. It has been found to be the virtual cornerstone of public health programs.

There is good reason why animal disease morbidity and mortality reports should be accumulated to reflect the situation accurately. This might be done within the structure of the present human disease reporting system. There are several reasons why this is important, the first being, of course, that there are an increasing number of diseases that are communicable from animals to man and, therefore, have public health significance. Reports would be of value to physicians since they concern matters of human health. Federal agencies are interested in such statistical materials, including the Bureau of Budgets, the Bureau of Animal Industry, and the Federal Civil Defense Administration. It has been recommended that emphasis should be directed toward a more general system of animal disease intelligence and that a state of cooperation leading to the initiation of general animal disease intelligence should be established at a national level.

Seven points were listed essential to assure full and successful operation of a satisfactory animal morbidity intelligence service. These are:

(1) A public health veterinarian should be on the staff of the state health department.

(2) The chief executive of the livestock regulatory agency of the state or the state veterinarian should be conversant with all phases of the program and have the means to administer such control measures as may be indicated.

(3) The program should have the written approval of the state veterinary association.

(4) A definite plan for collection, summary, analysis, and dissemination of data must be made before the program is started.

(5) A report of an unusually high incidence of disease should automatically activate investigative procedures.

(6) Critical evaluation of the program should be made at regular intervals.

(7) It should be understood that animal disease intelligence and disease control is a logical function of the livestock regulatory agency and that the program should embrace all animal diseases of both public health significance and economic importance.

When this program has demonstrated its value within a state, the economic and administrative responsibility for its continuance may be invested in the livestock sanitary authorities. It was further suggested that such a program, while extended to include all animal diseases,

might still operate on a cooperative basis since many health departments have mechanical facilities and the services of trained statisticians, both of which are necessary for the implementation of the program, and which are not available elsewhere.

Specific application of animal morbidity and mortality reporting to complement the statistics involving man in the cooperative prevention and control of communicable diseases is becoming more apparent. From this, it is hoped that plans will continue to develop and that new and different ways may be explored of tapping various facets of information to the end that statistics might become acceptable tools to the practitioner.

AIR SAC INFECTION IN POULTRY

Abstract of paper by Erwin L. Jungherr, D.V.M., and R. E. Luginbuhl, B.S., M.S., Department of Animal Diseases, Storrs Agricultural Experiment Station, University of Connecticut, Storrs.

The term "air sac infection" has come into prominence only in the last few years. In 1947, a thick, yellowish exudate over internal organs was observed in a poor lot of broilers. This, with accompanying changes in the air sacs, suggested the name to what was considered by some authorities a disease entity. Knowledge of the malady is beginning to be firm and present indications suggest etiological relationship with chronic respiratory disease in chickens, and to sinus and air sac infection in turkeys.

Anatomically there are nine air sacs in birds. These thin membranous sacs, which give buoyancy to birds for flight, connect with the exterior by penetrating bronchi and pneumatic bones. This respiratory arrangement predisposes the species to diseases of the system having no counterpart in mammals.

Symptoms of disease under field conditions vary with complicating disease and the age and species affected. Birds immune to both Newcastle disease and infectious bronchitis are commonly affected. In broilers, the disease makes its appearance at an average age of four to six weeks. Anorexia, whitish diarrhea, and cough are observed. Mortality may reach 50%. In growing and mature chickens, the corresponding affection is known as chronic respiratory disease and is indistinguishable from Newcastle disease and infectious bronchitis. In turkeys, the characteristic clinical expression is sinusitis. The primary gross pathologic feature is a fibrinopurulent serositis involving serous membranes of the lungs, heart, liver, spleen, and intestines. The inflammatory process may extend into underlying tissues, resulting in pneumonia, pericarditis, and hepatitis.

The etiologic agent is not known. Field data suggest that nonspecific factors may initiate outbreaks. These may be climatic, environmental — as pertain to managerial practices, infections, or stress factors—such as are induced by vaccinations. In the light of these concepts, the value of good sanitary management is apparent. Control may center on minimizing the factors that might influence establishment of infection. Definite recommendation for control must await further investigation now being intensified.

SANITATION AND VACCINATION IN CONTROL OF POULTRY DISEASES

Notes from a paper presented by C. C. Ellis, B.S., M.S., D.V.M., Ph.D., Edward Cook, B.S., D.V.M., A. W. McClurkin, D.V.M., and C. A. Brandley, B.S., M.S., D.V.M., Madison, Wisconsin.

Experiences at the Val-Lo-Will Farms, Inc., at Lake Geneva, Wis., were outlined in the presentation on the subject of immunizing broilers against Newcastle disease. This is one of the largest broiler producing plants in the United States, having facilities for 200,000 birds.

The subject of sanitation was emphasized. Some of the problems presented in such a large plant were described. These included the disposal of manure and dead birds.

The program in present use is intramuscular vaccination, employing 0.5 cc. of commercial stock formalized vaccine for chicks 16 days of age. A crew of three girls does the vaccinating and can handle 1,000 to 1,200 birds per hour. In fact, in a plant of this size, vaccinators have to average about this number to keep ahead of the crop of birds to be vaccinated. Pullets and birds to be retained for breeders are revaccinated with 1 cc. of the killed virus vaccine when selected at 10½ to 11 weeks of age or at the time birds are selected for slaughter. The question still remains in the minds of those in charge at this plant whether or not breeders need an extra booster shot after six months. Plans are now being laid to determine the feasibility of this program. The reason behind this procedure for vaccinating adult breeding stock is to protect baby chicks until vaccinated, by immunity through eggs of layers having a high titer of protection.

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The worth of our work ultimately will be judged by the extent to which we succeed in drying the tears from the eyes of suffering people.—*Nehru.*

Committee Reports

RABIES

Notes from report by L. E. Starr, D.V.M., M.Sc., Ph.D., public health veterinarian of the Division of Epidemiology, State Department of Public Health, Atlanta, Georgia, chairman.

The Committee report included the notation that on the whole the situation in reference to rabies in domestic animals and in the number of human cases was unchanged from that reported for 1951.

Dog rabies appears to be on a decline because these animals are domesticated and subject to control and immunization. It was reported that adequate immunization, which would include 70 to 80% of susceptible animals, plus destruction of nonimmune dogs, would prevent serious outbreaks in these animals within definite, controlled areas.

Rabies in wild animals, particularly in fox and skunk, is even more serious than in dogs. Once this disease becomes established in the wild life of a region, the only method of control or eradication is by thinning the host population to the extent that animal to animal contact is minimized. Whenever the infection in wild life is high, the incidence of rabies in domestic animals, including cattle, horses, mules, and hogs, is correspondingly high. Death of cattle with rabies in infected areas constitutes a serious threat to the agricultural economy of the region.

Likewise, vampire bat rabies is becoming a serious problem both to animals and man in Mexico and Central America. It is reported to be progressing north from the state of Chihuahua, which is geographically situated approximately 100 miles south of the United States-Mexican border. If conditions are favorable for propagation of the vampire bat in southwestern United States, it is possible and reasonable that this country might expect invasion of these small mammals.

The Committee report cites the experience in Georgia where approximately 70,000 dogs have been immunized with avianized, live virus, antirabic vaccine since May 1949. Most of these vaccinations have been performed in areas in which rabies has been endemic in dogs and foxes for many years. None of these animals has been revaccinated to date. There have been, in all, seven confirmed cases of rabies in these immunized dogs; six of which have been immunized annually at least twice with the killed virus vaccine. Mass immunization programs have been put on in 20 counties in Georgia, with live virus vaccine. All of these are in endemic areas. In most of them, 70% or more of the total dogs have been immunized.

In summarizing their report, the Committee recommended that further controlled experiments be conducted to determine the minimum age at which dogs should be immunized, the efficacy of immunization of cattle, the efficacy of post-exposure treatment, comparative studies on the efficacy of various types of antirabic vaccine, and durability of immunity induced. The Committee further recommended that studies should be continued to determine the most effective methods of controlling rabies in wild animals, particularly foxes and skunk, and that all states make intensive effort toward eventual eradication of this disease. Finally, it was recommended that the Association, through its Legislative Committee, make an effort to secure passage by Congress of the bill adopted by the Association in 1951 designed to enable the U. S. BAI to engage in rabies control as it pertains to all animals.

COMMITTEE ON FOOT-AND-MOUTH DISEASE

Notes from report of standing committee; M. S. Shahan, D.V.M., Washington, D. C., chairman.

Hopes expressed in this committee's report a year ago have been realized. In 1951, the main interest of this group was the Mexican campaign. The announcement of the lifting of embargoes on September 1, 1952, culminated an intensive fight that lasted almost six years. The U.S.L.S.A. may well be proud of its support of this cooperative international effort that stands as an unparalleled accomplishment in the history of animal disease control.

Since the Committee's last report, foot-and-mouth disease appeared in Canada and is reported "stamped out." Application of restrictions of Canadian importations have not yet been relieved.

Also, during the past year, the epizootic of this disease in Central Europe became one of the most serious of all time. Spread to Great Britain resulted in slaughter of 72,000 animals during the campaign to eradicate all outbreaks. The outbreak in Great Britain occurred on the Channel Coast. Ireland and Finland success-

fully avoided infection this year. Only limited disease occurred in Norway.

Though demand exceeded supplies for biological products, it is to be noted that vaccination fell into disrepute in many quarters. Prof. Gaston Ramon, secretary of the International Office of Epizootics, pointed out in a statement before the French Academy of Science that: ". . . at the present stage of our knowledge, vaccination against foot-and-mouth disease can serve as a complement only. In the manner in which it is practiced it may, at best, procure a relatively small degree of immunity of short duration, which may be unexpectedly annulled by a new type of virus."

The Committee referred to the complications and dangers existent in the current epizootic of vesicular exanthema. It was urged that vigorous action be taken by state authorities to eradicate this disease in swine. Every effort must be taken to eliminate anything that might tend to complicate problems of prevention and diagnosis of vesicular diseases.

BRUCELLOSIS ERADICATION PROJECT

Notes of report presented by Asa Winter, D.V.M., assistant in charge of the Brucellosis and Tuberculosis Eradication Division, Bureau of Animal Industry, Agricultural Research Administration, USDA, Washington, D. C., chairman.

The chairman of this committee reported that understanding and support of the brucellosis eradication project had hit a progressive stride.

Increasing support from cooperating nonregulatory officials, together with approval by the Brucellosis Committee of this association, of developments which may supplement accepted practices and standards, are important factors in recent accomplishments. The chairman drew attention to the report presented at the 1951 meeting of this association which he believed covered the period of our greatest advance on developments which are paving the way to the successful completion of the program.

Doctor Winter referred to the nationwide study by Prof. C. G. Bradt, extension animal husbandman of Cornell University, that extended as a survey of 23 states. Professor Bradt stated in his report that the eradication of brucellosis in cattle, swine, and goats is looked upon as the number one disease problem.

Referring to the problem of shortage of veterinary personnel for the conduct of the campaign, the observation was made that the application of the ABR or milk test, which was adopted only this year as an official practice, has been expanding rapidly and promises to overcome to a large extent the personnel shortage problem that has plagued the program for several years.

There were reported in 1952 an increase in vaccination and a healthy increase in blood-testing. A summary of the year's work shows that nearly 2,000,000 additional blood tests were applied with more than half of these conducted in the state of Wisconsin where a determined effort is being made to complete the brucellosis eradication project. Even eliminating this heavy expansion of activities in Wisconsin, there was still an increase of 16% in the volume of blood-testing throughout the remainder of the country. This increase was distributed over 26 states. With the increase in calf vaccination and blood-testing, it was recorded that 454,732 herds containing an estimated 8,585,416 animals, have been screened for Brucella infection by use of the milk ring test. These represent roughly 1,000,000 more animals than were blood-tested during the same period, thus more than doubling the total number of cattle on which determining tests for the presence of Brucella infection would have been possible without the benefit of this test. It is to be expected that the milk ring test will prove one of the greatest contributions towards making possible the successful fulfillment of the present project.

Statistically, it will be noted that there was an increase in blood reactors from 3.1% reported a year ago to 4.2% for the past 12-month period. This reversal in trend results from the selected method of blood-testing which was followed during the year in the state of Wisconsin. Eliminating the work in that state, it is to be noted that there was an actual reduction from last year's reported 3.1% animal infection rate to 2.7% for the period of this report.

Milk tests applied during the year have revealed generally that approximately 30% of the herds are positive and should be held for further check with the blood test to determine the effect on individuals. At the same time, the remaining 70% are identified as probably free of infection and, therefore, a fixed asset in the campaign for eradication.

The chairman of this committee felt that there is strong evidence to assure the continuation of conditions essential and necessary for the eventual completion of this project in spite of the difficulties attendant on problems of titer in vaccinated calves.

PARASITIC DISEASES

Notes of report presented by Benjamin Schwartz, A.B., A.M., Ph.D., chief, Zoological Division, Bureau of Animal Industry, USDA, Washington, D. C., chairman.

The report of the Committee for 1952 was limited to consideration of parasites and parasitic diseases of cattle.

In reference to external parasites, it was reported that cattle are free of common or psoroptic scabies. They are also free of cattle ticks, except those animals contained in a long, narrow buffer zone along the Rio Grande River into which ticks are introduced from time to time as a result of the drifting of cattle from both sides of the river.

The most important ectoparasites now affecting cattle in this country are lice, chorioptic, and sarcoptic mites, horn flies, cattle grubs, screwworms, and spinose ear ticks. Today, cattlemen seem to be more concerned about lice infestation than any other parasitic condition. Lice are present during the winter months in practically every herd. These pests persist from year to year. Aside from annoying cattle and causing unthriftiness, severe anemia and even death are reported in cases of severe infestation.

Lice

Currently, sprays are being successfully employed for control of cattle lice. Gasoline powered sprayers, developing a nozzle pressure of 200-400 lb., are good substitutes for the dipping vat. It must, however, be recognized that it is essential that all parts of the animal be wetted thoroughly, not omitting the head, face, inside of the ears, thighs, axillary regions, neck, brisket, and abdomen. The sprays employed include all the commonly used chlorinated hydrocarbon insecticides, as well as rotenone and pyrethrum. All are suitable in the recommended concentrations appearing on the packages.

Persistence of chorioptic and sarcoptic scabies in cattle is probably due to greater resistance of mites of these species to insecticides that have been employed on scabies eradication work. Another factor that may account for persistent infestations is the replacing of the dipping vat by power spraying apparatus and improper use of this power equipment. It is anticipated that it will be necessary to continue to use power sprayers since comparatively few dipping vats are now available or are maintained in good repair. The effort now must be directed toward the proper and thorough use of this equipment.

In regard to Bureau approval of benzene hexachloride as an official dip, no change is anticipated in the present regulations. Much more work will have to be done before specific recommendations can be formulated for eradicating the residual cattle scabies in this country with BHC.

Horn Flies

A concentration of 0.5% of DDT or methoxychlor suspension, the latter being preferable, is satisfactory for control of horn fly infestations in cattle. Methoxychlor may be used for dairy cattle, whereas DDT suspensions are prohibited for use on these animals. Several sprayings of both may be necessary to control horn flies during the summer months.

Cattle Grubs

Spraying and dusting cattle with solutions or powders containing rotenone are considered to be the only satisfactory methods of control of these parasites. Sprays, as well as the powders, are prepared from derris powder or cube powder containing approximately 5% rotenone. When sprays are used for the control of cattle grubs, it is recommended that high nozzle pressure be employed. This should be from 400-500 lb. per square inch. The volume of spray needed will vary with the length and thickness of the hair coat, but on the average, it is about two to three quarts per animal.

Screwworms

The treatment of choice for control of screwworms is that lindane preparation known as EQ-335. This agent, developed at the Kerrville, Tex., Experiment Station, contains 3% lindane in pine oil, mineral oil, an emulsifier, and silicate jell. It has been made available by veterinary supply companies under various brand names. It is applied with a paint brush and not only destroys maggots but attracts adult flies to treated wounds, destroying them. The usual recommendation is that treatment be repeated at weekly intervals, especially in those cases where many maggots are present in the depth of wounds.

Spinose Ear Ticks

One per cent lindane is the active ingredient recommended for ear oil prepared for control of the spinose ear tick. The oil may be prepared by adding four parts of a 25% lindane emulsion to 96 parts of pure pine oil, or it is obtainable commercially. The mixture is introduced into the ears of infected cattle by means

of spring bottom oilers. One-half an ounce of the oil per ear is the recommended dose. Treatment should be repeated in six weeks.

Internal Parasites

The chairman of this committee referred to only the most common roundworms of the digestive tract that infect cattle. These include the anemia-producing stomachworm, the medium stomachworm, the hair stomachworm, the hookworm, intestinal roundworms, threadworms, and the nodular worm. All except the three stomachworms occur in the small intestine; the three stomachworms in the abomasum.

All of these gastrointestinal roundworms have direct life cycles, which means that there is no intermediate host involved in their transmission. Ova pass with feces, and develop to infective larvae that are taken in during grazing.

Parasitism of the gastrointestinal tract may become sufficiently severe to cause death. However, it is important to bear in mind that these parasitic infections are insidious and the damage in ability to grow, gain, fatten, or produce milk is of considerably more importance than actual mortality. In some portions of the United States, retarded weight gains of young cattle were noted to be as much as 45 lb. per head on the average during a six month period on pasture. These animals were not the specimens which were obviously infected, but may be said to show at no time obvious symptoms of parasitism. These inapparent losses mean much more from the standpoint of beef production, rearing of replacements, and milk production than spectacular death losses that occur from time to time and that have been directly attributed to parasitism.

It must be noted that these parasites begin to produce their most injurious effects before they become susceptible to the anthelmintic action of drugs. The prevention of the acquisition by management practices is, therefore, of paramount importance. What these practices should be has not been completely determined. In those sections of the country where there has been a marked shift to grassland agriculture and in others where irrigated pastures are being developed, there is strong impetus to overstock. Parasites are largely pasture born and environmental factors that favor the prompt establishment and continued growth of pastures also favor the propagation of parasites. This point deserves emphasis and continued observation. Factors having to do with parasitic infection of cattle that are grazed on improved pastures must be considered in the management under the new grassland agricultural methods.

MORBIDITY AND MORTALITY

Notes from report presented by C. E. Wicktor, D.V.M., Los Angeles, California.

This committee has the most difficult task of any in the Association; also the one to which members of the Association have only recently become attentive. The current consensus of regulatory officials is that all favor a comprehensive animal morbidity and mortality reporting system.

U. S. Public Health Service now collects and publishes weekly statistics on some animal diseases. Rabies is the first of these, as it occurs in domestic and wild animals. Statistics are also published annually on bovine tuberculosis, which indicate the extent of it, the rate of infection, and the location by states. The same information is available on bovine brucellosis though not as complete. Definite information in reference to infection rate of other diseases of livestock is now drawn from meat inspection reports. This is not considered to be comprehensive. Estimates of disease among livestock generally are based on little more than limited observation and guesses.

The objectives of this committee were set forth in the report and are comprehensive. Initiative has been taken this year to make definite recommendations that there be set up at the national level and in existing organizations, a national reporting officer who will compile reports from state regulatory officials and distribute a composite back to the states and other interested organizations. In addition, it was suggested that bulletins on occurrences of diseases reported by telephone and telegraph be sent as the situation may warrant.

Appropriations for this effort were not sought. It is believed that in most states these morbidity and mortality statistics can be assembled, summarized, and reported under present budget allowances and by existing personnel. No new bureaus are advocated either at the state or national level. The opinion was expressed that the office of livestock sanitary officials should be able to assume this extra assignment without undue stress or impairment of the services now being performed.

A basic list of reportable diseases was as follows: To be reported immediately by telephone or telegraph; contagious pleuropneumonia, foot-and-mouth disease, fowl pest, rabies, rinderpest, scabies, Texas fever, vesicular exanthema, and vesicular stomatitis. To be reported on a prescribed form each week;

anaplasmosis, anthrax, atrophic rhinitis, blackleg, bovine bacillary hemoglobinuria, coccidiosis, contagious ecthyma, dourine, equine encephalomyelitis, glanders, hog cholera, hyperkeratosis, infectious equine anemia, Johne's disease, leptospirosis, listeriosis, malignant catarrhal fever, psittacosis, swine erysipelas, trichomoniasis, tularemia, and vibriosis. It is to be noted that brucellosis and tuberculosis were omitted from this list; the reason being that they are usually reported in a different manner.

The Committee urged that all state regulatory officials make plans at once to explain the proposed program to veterinarians and veterinary groups in their respective states and endeavor to secure the wholehearted support and cooperation of practitioners in the proposed program. This accomplished, and with supporting forms printed and ready for mailing the latter part of December, it was hoped the national morbidity and mortality reporting system could get under way beginning with the month of January 1953.

MILK AND MEAT HYGIENE

Notes from report presented by H. V. Stafseth, D.V.M., Department of Bacteriology and Public Health, Michigan State College, East Lansing, Michigan, chairman.

The unsatisfactory status of poultry meat inspection was the subject of considerable discussion at the 1951 meeting of this association. Since that meeting, poultry inspection has been subjected to further study. The findings are as follows:

(1) Efforts are being made toward wider application of checking and enforcement of sanitary requirements relative to poultry and poultry products.

(2) Conferences for poultry lay sanitarians have been offered by the Production and Marketing Administration.

(3) After July 1, 1953, the Grade A shield may no longer be used on dressed poultry.

(4) There is a serious shortage of veterinary meat inspectors.

According to data supplied by Mr. W. D. Termohlen, director of the Poultry Branch, Production and Marketing Administration, USDA, there were approximately 1,750 poultry processing establishments in the United States in 1949. Of these, 528 were official processing plants, which included those which dress only, eviscerate only, and those which do both. On March 1, 1952, there were 194 plants that had contracted for the inspection of poultry for wholesomeness. These operate under official inspection. There are few, if any, plants which operate under intermittent inspection, but some work seasonally. There are at present 204 full-time veterinary inspectors and 35 part-time veterinarians on the PMA staff, which includes supervisory personnel. In addition, there is a smaller number of lay inspectors. Also 159 lay inspectors of the Meat Inspection Division of the BAI hold poultry inspection cards and work part-time. All of these lay inspectors work under the supervision of veterinarians.

Figures supplied this committee emphasize the shortage of veterinary personnel for food inspection. There were cited the figures for a rather large city having 35 slaughter houses under city inspection. The budget of this city provides for 26 veterinary inspection positions. Only ten of these are filled. The balance of the vacancies for veterinarians have been filled with lay inspectors at health inspector salaries.

As a way out of the difficulty, there has been discussed the creation of a new profession of meat inspectors. Doctor Stafseth discussed this problem in a paper presented at the meeting of the A.V.M.A. in Atlantic City last June. In the opinion of this committee, the present poultry inspection service is, from both the administrative and enforcement standpoint, similar to the situation having to do with milk sanitation and inspection. This committee recommended the setting up of a local administration and enforcement service. They suggest state supervision to guarantee uniformity and maintenance of minimum standards of both sanitation and inspection. To assure widespread uniformity and acceptance of the product, a system of public health scoring by areas was also recommended.

Model ordinances for both poultry sanitation and poultry inspection must be formulated as guides to these groups. It was also recommended that a new committee be formed within the Association to consider minimum standards or that the U. S. Public Health Service be urged to present their recommendations, or that possibly the two working together might present them jointly.

The Committee expressed the opinion that dairy and milk hygiene, and especially meat hygiene, were veterinary problems, and that the meat inspection service must be left in the Bureau of Animal Industry where it has been so well handled in the past. Meat inspection constitutes a means of disease detection, which is the first step in effective control and eradication of communicable diseases.

NATIONWIDE COMMITTEE ON ERADICATION OF HOG CHOLERA

Notes from report presented by L. M. Hutchings, D.V.M., M.S., Ph.D., Purdue University, Lafayette, Indiana, chairman.

The Committee's report this year affirmed and supplemented the comprehensive recommendation made at Kansas City in 1951. (See VETERINARY MEDICINE, 47:17 [Jan.], 1952.) It was suggested that reprints of last year's report be forwarded to selected agencies, including the House and Senate Agriculture Committees, with recommendations for activation of provisions outlined.

The attention of the Committee on Laws and Regulations was invited to the urgent need for revision of existing laws, rules and regulations involving the interstate and intrastate movement of swine, with specific reference to the use of hog cholera immunizing agents other than serum and virulent virus.

Preliminary steps were reported to have been taken to ascertain procedures necessary to establish one or more areas in the nation as pilot test areas for the inauguration of a full scale hog cholera eradication program.

BIOLOGICALS AND PHARMACEUTICALS

Notes from report presented by A. H. Quin, D.V.M., Kansas City, Missouri, chairman.

The report of this committee had to do with recent advances in the application of sulfonamides and antibiotics. These two classes of chemotherapeutic agents, which field has been broadened to extend over many items, have been continuously developed to improve efficacy. Two new antibiotics, neomycin and polymyxin, were added to the armamentarium of practitioners during the past year.

In reference to biological products, the Committee report included the remarks made by Dr. B. T. Simms, chief of the Bureau of Animal Industry. "The new forms of hog cholera vaccine, modified live virus, rabbit origin and swine origin, are being well accepted as immunizing agents against hog cholera, according to reports received by the Bureau of Animal Industry. These reports are usually available within 60 to 90 days following the use of vaccines in the field. These reveal that results are quite satisfactory and that losses from all causes were around 1% in vaccinated droves. Since these reports come from all parts of the country and from both veterinarians and swine owners, they are regarded as a fairly accurate cross section of the results obtained following the use of these vaccines."

ADVISORY COMMITTEE ON ANAPLASMOSIS

Notes from report presented by H. Schmidt, D.V.M., College Station, Texas, chairman.

Though urged to do so, industry and the manufacturing chemists have not responded to appeals for assistance in the pursuit of answers to pressing and vexing problems presented by anaplasmosis in cattle. Neither have funds been made available through the Research and Marketing Act to state experiment stations to carry on the pretentious program of investigation of this insidious disease outlined by researchers in the southern states some years ago.

Limited favorable reports have appeared of the beneficial action of some antibiotics in acute attacks of the disease. These need corroboration on a larger scale.

SPECIAL COMMITTEE ON ANTHRAX

Notes from report presented by H. J. Rollins, D.V.M., Raleigh, North Carolina, chairman.

Eighteen points for the future control and prevention of anthrax were outlined by this committee. They included the recommendation that the practice of feeding meat of animals that die of unknown causes to mink, other furbearing animals, or zoo animals be prohibited; prohibition against removal of carcasses from farms in anthrax areas except under special permission; and the state licensing of rendering plants.

The Committee noted that additional research is needed on the anthrax problem with the object of developing improved immunizing procedures and gaining more definite information on the biology of the causative organism in nature and in the animal body.

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Leptospirosis of cattle due to the spirochete *Leptospira pomona* is characterized by bloody urine and sometimes the milk also is blood-tinged. The usual symptoms of inappetence, icterus, constipation, and anemia are also noted. Aged animals frequently die during an acute attack. Subacute cases recover slowly, though the causative spirochete is eliminated in the urine of recovered carriers so that spatters of urine are inhaled by susceptibles. Therefore, carriers should be segregated for several weeks until a laboratory diagnosis fails to demonstrate the etiological factor. The disease is being reported with increasing frequency from various areas. Antibiotics have been suggested to control the blood and general infection.

Hog Cholera Immunization With A New Vaccine, Propagated *In vitro*, And Hog Cholera Antiserum

N. H. CASSELBERRY,* D.V.M., W. A. MALMQUIST,* D.V.M.,
R. B. HOULIHAN,* Ph.D., and W. H. BOYNTON,* D.V.M., Berkeley, California

THE tissue culture method of propagating hog cholera virus was announced by Dr. W. H. Boynton in 1946. It was demonstrated at that time that hog cholera virus could be grown in abundance by this laboratory technic[1]. The new product, named viracine,® is a vacuum-dried, live, modified hog cholera virus vaccine which is prepared from virus cultivated in bacteriologically sterile tissue cultures by adaptation of experimental methods to commercial production.

Doctor Boynton's starting virus was commercial, virulent hog cholera virus. Virulence was retained for pigs by continued passage in laboratory media to 52 generations, without passage in animals of any species. However, the 52nd generation, when tested by injection in susceptible animals, failed to produce fatal infection. These test animals later survived challenge with virulent virus. This evidence of attenuation by cultivation was reported[2]. This finding led to further studies with the goal of reducing virulence to a safe level for field immunization. Continuous work with the culture and further passages have resulted in further modification and reduction of virulence. These studies have been reported[3].

Under laboratory conditions, the cultured virus, viracine, was safe without the simultaneous administration of hog cholera antiserum. However, when injected alone, a transient rise in temperature was usually observed between the fifth and seventh days. Occasionally pigs in some groups displayed visible illness for a few days. Recovery was usual.

Death losses occurred in some subnormal groups after vaccination. It appeared that these were the result of over-reaction which permitted existing dormant infections to become established. Preliminary field studies in California using viracine alone substantiated laboratory trials but indicated the advisability of using hog cholera antiserum, injected simultaneously with the vaccine, for safe immunization of pigs under variable field conditions. These variables which may influence vaccine reaction and development of satisfactory immunity include management practices, feeding, sanitation, parasites, and subclinical intercurrent infectious diseases.

Editor's Note

*** The authors of this paper are associated as research and development specialists of the Cutter Laboratories, Berkeley, Calif. Work in this field was begun some years ago and has continued with increasing intensity as a company project. This report is considered to be of special significance. It not only represents the first successful commercial production of virus vaccine in sterile culture media, but sets the stage for use of this technic for production of similar immunizing agents for other virus diseases of animals and man.**

This is the first of a two-part discussion reporting laboratory tests and field trials with viracine. The second will appear in a sequent issue of this journal.

Field Trials

To establish safety and immunizing value of viracine injected simultaneously with hog cholera antiserum under field conditions, studies were initiated in California and Iowa. For this work, necessary approvals were secured from the state regulatory officials and from the Bureau of Animal Industry.

The general plan was to supply the new vaccine and serum to practitioners for use on herds presented for vaccination in their practice. The selection of those to be treated in California trials was left largely to the veterinarian; in the Iowa trials, practitioners had sole control of the selection of droves to be vaccinated. Agreement forms were furnished to assure owners that any losses due to vaccination failures would be assumed by the manufacturer. Each herd was sampled by removing a few susceptible pigs. These unvaccinated animals were delivered to a BAI licensed laboratory** where they were challenged by

®A special license to produce and market viracine commercially has been issued to Cutter Laboratories, Berkeley, Calif., by the Bureau of Animal Industry.

**All exposures from the California trials were run at Cutter Laboratories. The exposures from the Iowa trials were run at the Grain Belt Supply Company, Omaha, Neb.

injection of virulent hog cholera virus. This test was necessary to determine whether the droves in which the new product was used were cholera-susceptible at the time of treatment.

Vaccine and diluent were supplied in regular market containers with instructions for administration. The restored liquid vaccine was then administered in 2 cc. doses intramuscularly. Each veterinarian was cautioned to sterilize syringes and needles for mixing and injecting the vaccine by boiling rather than by chemical disinfection.

The dose of serum recommended for simultaneous injection was varied with weight of the pigs. A 10 cc. dose was used in pigs under 100 lb.; 15 cc. for those between 100 and 150 lb.; and a 20 cc. dose for those weighing over 150 lb. This dose was determined to be sufficient to prevent unfavorable reaction. It was also determined that susceptible pigs in contact with vaccinates did not shed infective virus for susceptible contacts. In so far as could be determined, only unexposed pigs were vaccinated.

The use of skin antiseptics on the vaccination site was not discussed. Cooperating veterinarians in the habit of using skin antiseptics continued to do so in these trials.

Each cooperating veterinarian reported results of the vaccination on a field trial report form supplied for use. Information elicited was essentially that shown below:

VIRACINE FIELD TRIAL REPORT

Veterinarian_____ Address_____
Owner of pigs_____ Address_____
Date of vaccination_____ Viracine serial no.____
Dosage of serum used_____
Number of pigs vaccinated____ Age or size_____
Condition of pigs (general remarks)_____
Pigs were: Home raised_____
Purchased as feeders_____
Were any unusual reactions to vaccination observed? (remarks)_____

After vaccination, each herd was sampled by removing a few pigs for virus challenge. This was scheduled for approximately two months postvaccination. Herds which were to be fed long enough to permit a second challenge at market time were sampled again to test immunity at this time.

Results in California Trials

The field studies in California were started in October 1951. A total of 2,451 pigs in 12 herds were vaccinated. This was done by four veterinarians. Among these animals, 11 died from all causes within three weeks. In no instance was the vaccination incriminated as the cause of death. Seven of these dead pigs died after vaccination of one large herd of 319 animals. At the time vaccination of this herd was planned, many were sick with what was diagnosed clinically as necrotic enteritis. Vaccination was withheld for about three weeks until the herd recovered. The veterinarian reported that seven pigs died between two and three weeks after vaccination with symptoms and postmortem findings typical of necrotic enteritis.

There were 53 pigs exposed from these 12 herds to determine susceptibility to cholera. All control animals succumbed.

Fifty-one pigs were exposed after vaccination at intervals of from two to 7½ months. Of this number, only one animal failed to survive the challenge. This pig was one of three challenged two months after vaccination of the drove in which necrotic enteritis was evident at the time of vaccination. This drove was made up of home raised pigs and pigs which had been purchased and held in isolation for two weeks before vaccination. The entire lot, including home raised animals, was stunted. There was no unfavorable reaction to vaccination. The three selected and delivered to the laboratory for challenge were in poor condition. Two of these survived injection of virulent hog cholera virus without reaction. The other animal died and at autopsy revealed extensive lesions of necrotic enteritis in the colon.

SUMMARY OF CALIFORNIA TRIALS

Vaccination	
Number of veterinarians	4
Number of herds vaccinated	12
Number of pigs vaccinated	2,451
Number died following vaccination	11
Controls	
Number of controls exposed	53
Number of controls died	53
Challenge of Vaccinates	
Interval after vaccination	2-7½ mo.
Number of vaccinated pigs challenged	51
Number died after challenge	1

Note: Exposure of controls and challenge of vaccinated pigs by injection of 2 cc. virulent hog cholera virus blood.

Results in Iowa Trials

Field studies on hog cholera immunization with viracine and serum were started in southwestern Iowa in June 1952. In these trials, 4,862 pigs were vaccinated in 39 droves. Nine practicing veterinarians located in Iowa participated. Ten pigs died from all causes within three weeks. In no case was the vaccination incriminated as the cause of death loss. Five

of the animals that died were in the first drove vaccinated. In this drove, 30 animals were found sick two days after vaccination. Diagnosis of acute salmonellosis was made and confirmed by laboratory findings. All but five of the sick animals responded to treatment with none sickening during the fifth to eighth days when vaccinal reactions might logically be expected.

From these vaccinates, 141 pigs were selected before vaccination for exposure to determine susceptibility. Of these, 134 proved susceptible to hog cholera. Pigs from only one drove proved completely immune.

To date, a total of 114 pigs from 34 of these droves have been challenged at intervals of from two to three months after vaccination. Only two of these animals died. Information supplied on the autopsy findings indicates that both revealed lesions of severe pneumonia. It was interesting to note that the pigs challenged from the drove described as showing acute salmonellosis two days postvaccination were found to be solidly immune to challenge with virulent virus even though they were vaccinated in the early stages of the disease.

SUMMARY OF IOWA TRIALS

Vaccination	
Number of veterinarians	9
Number of herds vaccinated	39
Number of pigs vaccinated	4,862
Number died following vaccination	10
Controls	
Number of controls exposed	141
Number of controls died	134
Challenge of Vaccinates	
Interval after vaccination	2-3 mo.
Number of vaccinated pigs challenged	114
Number died after challenge	2

Note: Exposure of controls and challenge of vaccinated pigs by injection of 2 cc. virulent hog cholera virus blood.

Ten pigs from one of the Iowa herds which had been sampled at two months postvaccination and found to be solidly immune to virulent hog cholera virus challenge were purchased and moved to a serum plant. These pigs averaged 170 lb. At the same time, ten animals, from a farm in the same area, which had been vaccinated with virulent virus and serum by the same veterinarian were also delivered to the serum plant. Both of these groups were hyperimmunized with the required dose of 5 cc. of hyperimmunizing virus per pound body weight. Ten days after hyperimmunization, all of the pigs in both groups were observed and temperatures taken in preparation for the first bleeding on the following day.

Four of the viracine and serum pigs were afebrile and were bled on the 11th day. Two not suitable for bleeding were visibly slow on the tenth day. The other animals rejected for bleeding had elevated rectal temperatures only.

In the group of ten animals which had received virulent virus and serum 90 days previous to hyperimmunization, two of the animals were afebrile on the tenth day and were, therefore, bled on the 11th day. One of the animals in the unsuitable group demonstrated visible symptoms. All other animals unsuitable for bleeding had high temperatures only. All animals in both groups survived hyperimmunization though neither group was entirely satisfactory for serum production in view of missed bleedings as a result of temperature reactions.

SUMMARY OF TOTAL FIELD STUDIES

Vaccination	
Number of veterinarians	13
Number of herds vaccinated	51
Number of pigs vaccinated	7,313
Number died following vaccination	21
Controls	
Number of controls exposed	194
Number of controls died	187
Challenge of Vaccinates	
Interval after vaccination	2-7½ mo.
Number of vaccinated pigs challenged	165
Number died after challenge	3

Note: Exposure of controls and challenge of vaccinated pigs by injection of 2 cc. virulent hog cholera virus blood.

Discussion

In planning these field trials, the main objective was to attempt to simulate as nearly as possible conditions under which the product would be used when available through regular commercial channels. Practicing veterinarians who cooperated in these field trials were all experienced in hog cholera immunization with serum and virulent virus. The decision as to what droves in their practice were to be vaccinated with this vaccine was left entirely up to them, as was the selection of control pigs and the sampling of herds for challenge of the vaccinated groups. They were properly informed as to precautions necessary in the handling of viracine, and the dosage of both viracine and serum was given as suggested and outlined in the foregoing. All exposures of control groups to check susceptibility, and the challenge of vaccinates were carried out at a licensed laboratory under the observation of the local BAI inspector.

Summary

Viracine, a modified, live, hog cholera virus vaccine produced in tissue culture, was admin-

istered with hog cholera antiserum in field studies in California and Iowa. A total of 7,313 pigs in 51 droves were vaccinated and results reported. After vaccination, practicing veterinarians submitted field reports three to six weeks after each herd was vaccinated. Twenty-one pigs died within this period after vaccination from all causes and vaccination was not incriminated as the cause of deaths. A few pigs from each herd were left unvaccinated and susceptibility checked at a licensed laboratory. A total of 194 control animals were exposed; 187 developed typical hog cholera. In only one Iowa drove were control animals completely refractory to virulent virus injection.

After vaccination and at intervals of from two to 7½ months, a few pigs from each herd were challenged. Of a total of 165 animals so exposed to virulent infection, only three have failed to survive. On a percentage basis, 98.1% were fully protected up to 7½ months postvaccination.

A group of ten 170 lb. animals which had been vaccinated with viracine and serum and retained on the same farm for 90 days were hyperimmunized with the required dose of 5 cc. hyperimmunizing virus per pound body weight. At the same time, ten animals from another farm in the same area vaccinated by the same veterinarian by the simultaneous serum and virus method were also hyperimmunized. All of these survived. Neither group was entirely satisfactory in that bleedings were missed because of high temperatures, but the viracine and serum treated group showed fully as much resistance to the hyperimmunizing dose as those vaccinated with serum and virus.

Acknowledgment

We wish to express our sincere appreciation for the cooperation received from all of the practicing veterinarians who participated in these trials and to the Grain Belt Supply Company for handling test exposures.

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Federal Quarantine Imposed in California Because of Sheep Disease

A federal quarantine has been imposed in Butte County, California, because of the infectious disease of sheep known as scrapie. The disease has been definitely identified among two flocks in that area.

Under federal restriction, no sheep that have been directly exposed to scrapie may be moved from the quarantined area except for immediate slaughter and then only to an establishment specifically approved by the BAI. No sheep may be moved interstate unless an inspection by a Bureau inspector shows that they are free from infection with, or exposure to, scrapie and other contagious diseases. Sheep may pass through the quarantined area only in direct transit from one point to another outside the area. All transportation facilities, including those for feeding, watering, and resting sheep as well as railroad cars, trucks, and boats which are used to move the animals from a quarantined area across state lines, must be thoroughly cleaned and disinfected.

All sheep known to be infected are to be killed and burned or buried on the premises. Indemnities for such animals will be paid to the owner under a cooperative federal-state program.

Scrapie has caused serious losses in Great Britain and has appeared in France, Germany, and a few times in Canada. This is the first time it has been officially diagnosed in the United States. It is a virus disease with an unusually long incubation period, reported to extend from several months to two or three years, or even longer. Early symptoms are not readily recognized. Restlessness and excitability may be noticed first, followed by intense itching. There is a progressive lack of coordination, with convulsive seizures, and great weakness. The disease is usually fatal and runs a course of six weeks to six months or longer.

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No Gain

From time to time the U. S. Department of Agriculture press releases inform of the lifting of quarantines imposed because of vesicular exanthema in specified areas and a list of new quarantines imposed in other widely separated areas.

The most apparent truth revealed by these releases to the general press is that the virus of vesicular exanthema of swine continues to exist; and probably in pork now in normal trade channels. The sum of accomplishment thus far in control or eradication of this vesicular disease is cancelled by new outbreaks.

Plastic Fracture Sleeve

J. MALCOLM BAKER, D.V.M., M.S., Montreal, Canada, and
FRANK K. BRACKEN, D.V.M., Pullman, Washington

DURING a study of the plastic, internal fixation sleeve in a series of femoral fractures in 15 dogs, nonunion was noted in each case. The consistent results of nonunion prompted the investigation reported herein.

Review of Literature

Use of the sleeve or collar for fixation of long bone fractures has been described by several workers. Venable and Stuck[1] found that Robineau in 1928 had described a metal collar of aluminum bronze which was bent around fractures. Later, Pascal described a somewhat similar appliance designed to hold shaft fractures. The various encircling metal bands produced erosion of the bone beneath them, which was generally ascribed to a pressure necrosis. Recently it was pointed out that the necrosis resulted from an electrolytic reaction between the active metals and the body tissues and fluids.

In an endeavor to utilize inert materials, Schaffer[2] devised a plastic sleeve for fracture fixation which he claimed gave excellent results. However, Leonard[3] found that the sleeve did not meet the claims of the inventor and stated that it was not physiologically sound.

The type of plastic used in the construction of the Schaffer sleeve has not been disclosed. It bears a definite similarity to polyethylene in physical characteristics, as described by Ingraham, Alexander and Matson[4].

Method

The sleeve was utilized as the sole means of fixation in fractures of the middle third of the femur in a series of 15 dogs. Fractures were reduced surgically and the animals observed for a period of 90 days. At the termination of this time these animals were humanely destroyed and the femurs removed for gross and histological examination. In addition, three samples of the plastic, of known weight, had been implanted subcutaneously and intramuscularly at time of surgery. These were removed after 90 days, weighed and the surrounding tissues submitted for histological examination. Representative sections were stained with hematoxylin and eosin, Nocht's variation of Giemsa's stain and Mason's trichrome stain. A detailed study was made of histopathological changes occurring in the sections.

Gross Pathology

On postmortem removal of femurs, it was noted that nonunion was present in each case. Surrounding the sleeve was a proliferation of

Fig. 1. X-ray photograph taken three months following reduction. Note excessive exostosis, nonunion, and loss of density.

immature bone which originated above and below the sleeve ends and terminated just before reaching the fracture site. (Fig. 1). In most cases, the greatest response of the callus or exostosis was on the medial aspect, from the distal extremity. It is thought that the response followed the lines of greatest stress, as immobilization was seldom complete. There was no gross evidence of tissue reaction about the plastic, although in one case a discharging sinus was traced to a sequestrum.

On removal of the plastic sleeve, the underlying bone appeared pitted. Gross longitudinal sections of the bone revealed eburnation of the marrow cavity which extended on either side of the fracture site to a distance equal to the extent of the enclosing sleeve. Cortex in this area was thin and indistinct. No evidence of periosteum was visible since it had been stripped away and placed outside of the sleeve during the surgical reduction. The enclosed bone frequently was smaller in diameter than the opposite intact femur. Radiologically, this area exhibited a progressive loss of density.

Upon removal of the plastic implants, no particular tissue reaction was observed. Plastic appeared to be in the same condition as when implanted. In each of the three samples, a thin, slightly cyanotic fibrous membrane enclosed the plastic. No observable loss in weight could be detected in any of the implants.

Histopathology

Histopathological changes occurred in the fractured bones; the exostosis surrounding

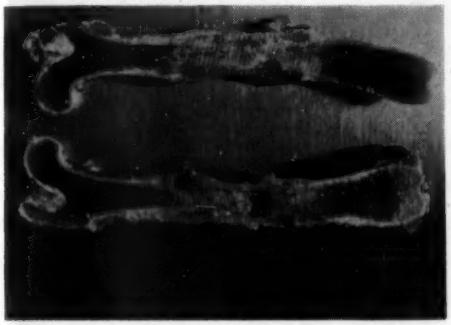

Fig. 2. Photograph of longitudinal section of femur three months after reduction with the Schaffer sleeve. Note eburnation of the marrow cavity, nonunion and moderate exostosis.

them and the tissue implants did not vary appreciably in the specimens examined.

Specimens of bone taken at the fracture sites exhibited extensive internal calluses. These calluses, composed of osteogenic tissue, osteoid tissue and bony spicules were so well developed that it was difficult to distinguish between cortical and medullary bone due to the proliferative changes present. Cortical bone adjacent to the sleeves showed evidence of erosion and replacement by fibrous tissue.

Nonunion of the bone shafts was noted in the fracture areas. Islands of cartilage were present, indicating endochondral ossification due to incomplete immobilization of the fracture segments.

Well defined exostoses were noted surrounding the Schaffer sleeves. These areas were characterized by large zones of osteogenic tissue, osteoid tissue, and bone spicules. Also, many areas contained active bone marrow elements of the reticuloendothelial system.

Sections taken at the various sites revealed one common feature. Microscopically, there was evidence that the sleeve material had some foreign body reaction with the tissues coming in contact with it. Immediately adjacent to the sleeve and tissue implants were narrow zones of mononuclear macrophages and fibrous tissue.

Conclusions

The hollow construction of the plastic Schaffer sleeve does not adequately control the fracture segments, and because of this incomplete immobilization, the following changes occurred: (1) Nonunion; (2) excessive exostosis and internal callus, and (3) endochondral ossification.

In addition, it was found that some microscopic evidence existed of a foreign body reaction between the plastic and the surrounding tissue, although it is doubtful whether this reaction was sufficient to alter the course of normal bone healing.

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Dr. H. C. Stephenson Named Gaines Veterinary Consultant

Dr. Hadley C. Stephenson, professor of therapeutics and small animal diseases, New York State Veterinary College, Cornell University, Ithaca, will become veterinary consultant to the Gaines Dog Research Center upon his retirement on February 1, 1953.

Doctor Stephenson, 59, decided on early retirement from his school duties in order to be able to pursue special interests otherwise unfulfilled because of an extremely busy life.

Son of a veterinarian, grandson of a veterinarian, and brother of a veterinarian, Doctor Stephenson obtained his B.S. and D.V.M. degrees at Cornell, whose veterinary faculty he joined in 1920. He was named assistant professor in 1926 and professor in 1938. Over the years he has made a special study of the action of drugs in disease, particularly diseases of the urinary and genital systems of the dog. He is credited with being the first to adapt the Bemis technic for enucleation of the eye in bovines to dogs, and the first to study nembutal as an anesthetic in dogs, cats and horses. He is the editor of the Veterinary Drug Encyclopedia, to be issued in 1953, a member of the committee on nomenclature of the American Veterinary Medical Association, and a member of the committee on education of the American Animal Hospital Association.

EDITORIAL COMMENTS

What the Agricultural Press Is Telling Your Clients

An editorial appearing in *Hoard's Dairyman* for November 25, 1952, endorses calfhood vaccination for brucellosis as a "blessing." The problem of the vaccinate that fails to lose agglutination titer at calving time may be magnified unless the blood-testing and vaccination program is continued along realistic lines.

The editorial cautions farmers to have calves vaccinated early by stating, "If you would minimize your vaccinal headaches, keep that age of vaccination below eight months."

Arbitrary application of laws and regulations by some state veterinarians fails to accomplish results intended and may work to defeat the effort by discouraging cooperation among dairy farmers. Readers were told that the United States Livestock Sanitary Association recommended that states provide for animals by allowing entry of those vaccinated during calfhood if they originate from clean herds or if agglutination titer does not exceed 1:50 in three consecutive tests.

In the same issue of the farm journal mentioned in the foregoing, Dr. E. A. Woelffer in his Veterinary Column stated that the definition of a free-martin needs revision. The premise that all heifers born twin to bulls are sterile is not factual. He recommended that an examination be made to assess whether or not such heifers are sterile, which may be done accurately at an early age, according to methods developed at the New York State Veterinary College. Doctor Woelffer suggests that free-martin refer only to those twin heifers that exhibit abnormalities or imperfections of the reproductive tract. He advises not to sell such twins as sterile unless they are determined to be so by veterinary examination.

In a feature article appearing in *The Farm Quarterly*, Winter 1952, associate editor Charles R. Koch presents a popular story on use of hormones. This discussion, though brief, is comprehensive and should serve to develop reader consciousness. This is considered desirable though such conversance may tend to increase the already too frequent request, "Can't you give her a shot of something, Doc?" for anything from overgrown toes to infectious disease. Well qualified authorities are quoted on the use and value of a number of endocrine preparations. In summary, Editor Koch advises his readers that endocrine therapy gives promise of saving animals which would otherwise be condemned and that continued refinement of products and advances in the veterinarian's skill in their use are to be expected.

The editors and staff of VETERINARY MEDICINE wish you and your family a very Merry Christmas and a Happy New Year.

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Enrollment in Veterinary Schools

A total of 3,858 students have matriculated in veterinary medicine for the 1952-53 school year in 19 schools in the United States and Canada. This number is only nine less than that reported a year ago.

This year's senior classes contain 865 students, practically all of whom will be graduated this spring.

According to the annual report (*Jour. Am. Vet. Med Assn.*, 121:499 [Dec.], 1952), no student has been accepted for enrollment in the veterinary curricula of the 17 schools in the United States without having completed at least two years of preprofessional training. This year 25% of enrollees have had three years and 33% four years of college education. Of 2,879 applications for admittance to veterinary schools, 909 freshmen were accepted.

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An Indian veterinarian, M. R. Marathe, writing in *The Indian Veterinary Journal* for September 1952, recommends use of "any of the veins at the back of the external ear" for intravenous therapy in cattle and buffalo.

The skin of the ear is comparatively thin and tender and a small needle can be used for injection, thus reducing the flow of liquids into the vein. A heavier gauge may be used if desired. The author claims a number of advantages, including convenience and safety of the operator and comfort to the patient.

Rotenone Spray for Cattle Grub Control

Elaborate spray equipment to develop high pressure at the nozzle is not necessary for effective grub control. In recent field trials, pressure of 200 lb. per square inch gave up to 89% kill.

The season for control measures is now under way in most southern states. In the central and northern portions, treatment should be given at about 30 days after small lumps appear on the back. Two or three treatments at 30-day intervals are recommended.

Solution for either high or low pressure spraying may be made by adding 7.5 lb. of a 5% rotenone powder per 100 gallons of water. The back of each animal should be thoroughly wet. One gallon of spray material is recommended by Bureau entomologists for short-haired southern cattle; a larger quantity may be required to penetrate heavy winter hair coats of cattle in the Midwest or North.

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Development of Oleomargarine

Though there is only slight resemblance in the present product to the first commercially produced oleomargarine, the origin of this industry may be traced to France. During the Franco-Prussian War, Napoleon III offered a large cash award for a substitute for butter. The prize was won by a chemist in 1869. In 1873, this process was patented in the United States and the commercial manufacture begun.

The required term "oleomargarine" is prescribed for all wrappings and containers for this product though they are now prepared exclusively from vegetable oils. These include oils produced in this country from cotton seed, soybean, and peanuts, and those produced from imported copra or the dried meat of coconuts.

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Great Britain's Tuberculosis Eradication Plan

As of August 1952, 90,000 herds were listed as "attested" in Great Britain. This is an increase of over 30% during a period of approximately 20 months. Now included in attested herds are 3,500,000 cattle, or 36% of the estimated total. The Area Eradication Plan is considered to have made satisfactory strides to ultimate eradication of bovine tuberculosis in Great Britain.

USAF Veterinary Officer Receives Award

Colonel James R. Karr, USAF (VC), has recently been awarded the first Oak Leaf Cluster to the Legion of Merit. He received the award while on duty in his current assignment as Command Veterinarian for Far East Air Forces in Japan. In the citation, Colonel Karr was commended for exceptionally meritorious conduct in the performance of outstanding service in the United Nations from July 4, 1951 to July 15, 1952. Colonel Karr is from Coshocton, Ohio. He was graduated from the College of Veterinary Medicine, Ohio State University in 1932.

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Time Studies on Sperm Activity

In general, the belief has been expressed that from two to four hours is the elapsed time following natural mating in cattle for sperms to be transported from the cervix to the ovarian portion of the oviduct. A series of experiments at the University of Illinois was undertaken to determine the exact time required for sperms to be transported from the cervix to the uterine horn, in both natural matings and in artificial insemination. It was found that following artificial insemination the tract was negotiated in "less than 2½ minutes by motile sperm. Non-motile spermatozoa inseminated into the cervix were transported to the ovarian portion of the oviducts in 4.3 minutes or less. In natural mating, the time interval was 3.3 minutes or less." The conclusion reached is that in artificial insemination it is not necessary to deposit semen in the cavity of the uterus.

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Observers in the Gulf Plains and Rocky Mountain regions where fluke infection is a major parasitic problem report severe damage due to flukes. Condemnations of infected and damaged livers is reported to exact an annual toll of $3,000,000.

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The Santa Gertrudis

Adaptation of beef cattle for range conditions on the King Ranch, Kingsville, Tex., prompted work resulting in the development of a new breed—the Santa Gertrudis.

The first cattle on ranges in southern Texas were introduced from Spain. These were commonly known as Longhorn or Mexican cattle. These animals were prolific, hardy, and wild, but did not mature into a desirable type of beef cattle. To achieve improvement in quality, Hereford and Shorthorn bulls were used on native cows. Importation of purebreds of British breeds and grading-up with sires of these breeds improved the quality. Over a period of 40 years, this process has resulted in production of satisfactory animals but these suffered from unfavorable conditions common to much range country of Texas.

Shortly after the turn of the century, Zebu and Brahma cattle of India were imported and immediately attracted attention of breeders in east Texas because of their resistance to pests and their hardiness under severe range conditions, including frequent droughts.

Development of the Santa Gertrudis breed was no accident. Many years of investigation of crosses involving, among others, the two

Caton, great grandson of the foundation sired Monkey, has proved one of the best producing sires of successive male descendants. All animals of the breed have cherry-red coats and white switches and some white underline markings.

major British breeds and Brahma have been charted. These have been exhaustive and followed the general methods of selecting groups of females to be bred by selected bulls handled as separate herds on different ranges. Monkey, sired by the Brahma bull Vinotero, out of the cross Shorthorn, ranch milk cow carrying one-sixteenth Brahma blood from Chemmera, a halfbred Shorthorn-Brahma bull, became the foundation sire of the breed. Close inbreeding

Santa Gertrudis steers ready for market. These animals weigh over 2,300 lb. as four-year-olds.

was practiced so that the entire herd is now descended from the original foundation sire.

Monkey produced during his life upward of 150 useful sires. Over 5,000 cows of breeding age and over 15,000 purebred Santa Gertrudis bulls are being used in grading-up general herds on the King Ranch. Pictured is Caton, great-grandson of the foundation sire.

An idea of the type, appearance and size of steers of the breed may be obtained from the accompanying photograph of two four-year-old animals. Average weight of steers at this age is approximately 2,300 lb. when finished on grass for market. It is claimed that these steers will outdress other grass-fed cattle by approximately 3%; that carcasses have a high percentage of choice cuts and proportion of meat to bone. Quality of meat is excellent and well covered. The propensity to fatten on range grasses, hardiness, resistance to heat and insect pests, and ability to make economical gains are listed as a distinct advantage of the Santa Gertrudis over other breeds handled under Texas range conditions. Calves at weaning time average 100 lb. over those of Hereford and Shorthorn cows of good quality and at eight months will outweigh calves of these breeds by 500 lb. Average weight of marketable two-year-old steers is 1,400 lb.

The breed derives its name from the land grant by the Crown of Spain covering land on which the King Ranch is now located. This was known as the Santa Gertrudis Land Grant.

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Meat production under federal inspection for the week ending November 22, 1952, was estimated at 425,000,000 lb., according to the USDA. This was an increase of 14% compared with the 373,000,000 lb. the previous week and was 34% above the 318,000,000 lb. produced during the corresponding week a year ago.

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If anything has been learned about vesicular exanthema during the past 20 years in California and the past months throughout the country, it is the constant danger of spreading the disease through the medium of garbage.—*Francis J. Mulhern, D.V.M.*

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Advertising of the poultry industry by beautiful displays in magazines having wide circulation has stimulated sales and increased demand for chicken.

Plan to Open United States-Canada Border, March 1, 1953

The office of the Secretary of Agriculture has announced that if present favorable conditions continue, Canada will be declared free of foot-and-mouth disease on March 1, 1953.

Action has been started on regulations which will permit the entry of Canadian cattle, sheep, other domestic ruminants, and swine, and fresh, chilled, or frozen beef, veal, mutton, lamb, and pork. Restrictions now applied to other animal products and hay and bedding also will be removed.

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The Mesquite Problem on Southwestern Ranges

Through overgrazing, drouth, reduction of range fires, and dissemination of seed by livestock, birds, and animals, mesquite, hardy, deep-rooted plant of the Southwest, has seriously reduced grazing capacity of some ranges.

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Veterinarians Needed for Positions of Veterinary Poultry Inspectors

The Poultry Inspection Section of the USDA is in need of qualified, graduate veterinarians to fill vacancies. Due to the continued expansion by the poultry industry in the evisceration and processing of ready-to-cook poultry under federal inspection, openings are available in various sections of the country.

Entrance salary is $4,205. per annum, based upon a 40-hour work week, except that consideration may be given to an entrance salary of $5,060. per anum when in the judgment of the Production and Marketing Administration, the applicant has qualifications for a higher grade. Compensation is provided for ordered overtime that may be performed in excess of 40 hours.

No written examination is required. Appointments are made on the basis of applications submitted. Opportunities for advancement are excellent.

Veterinarians interested in part time or seasonal employment are invited to apply, as some plants operate on a seasonal basis.

For further information, those interested should address the United States Department of Agriculture, Production and Marketing Administration, Poultry Inspection Section, Washington 25, D. C.

VETERINARY PARASITOLOGY

A. O. FOSTER, B.A., M.A., Sc.D.
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Systematic, Preventive Medication Against Sheep Parasites

The practicable measures for controlling most of the injurious gastrointestinal nematodes that are a constant hazard to successful sheep production are a mixture of good professional sense and sound sheep management. This is emphasized, and certain essentials are herein reiterated, because, in the first place, the recent technical literature may not have contributed as effectively as it could have toward clarifying issues for veterinarians who cannot give long hours to assimilating the many studies from Australia, England, and the United States. This refers to studies that have dealt with the complicated epizootology of parasitism and the innumerable factors associated with the occurrence of specific parasitic diseases. However, because these tedious studies are basic to the formulation of rational treatment programs and control practices, it would be unfortunate if they were permitted to complicate, rather than simplify, the immediate and practical control of parasites. In the second place, some sheep raisers are apparently becoming confused by the variety of recommended practices. A few appear to believe (with some basis) that good nutrition and proper selection of stock, or diligent attention to some other aspect of good management, will take care of the parasite problem. Far too many seem to have the false impression that reliance upon medication is the proper and complete solution.

Antiparasitic medication is an undeniably potent and practicable weapon against parasites, both therapeutically and preventively, but efficient control of sheep parasites cannot be achieved without sound management practices. Good feeding, proper stocking, adequate sanitation, continued surveillance, special attention to breeder ewes and new lambs, and other aspects of improved management contribute notably to reduction of exposure to parasitism, to building up the resistance of animals to the injurious effects of parasites, and to maintaining a high degree of immunity to the acquisition of parasites. If warranted by circumstances, a veterinarian may recommend more specific steps to control parasitism, such as (1) elimination of swampy or wet pasture land by draining, filling, or fencing; (2) improvement of pastures and forage crops; (3) correction of overstocking or overgrazing; (4) pasture rotation; and occasional resting or "spelling"; (5) alternation of pastures, to the extent feasible; (6) concentration on stock of special constitution or breeding qualities; (7) improved hygienic practices; (8) early segregation of sick and unhealthy animals; (9) special attention to breeding inequalities, birth hazards, nursing inadequacies, docking and castration risks, shipping facilities of lambs, and other items. This list could be greatly extended, but it all adds up to good management. Treatment against parasites is, therefore, an adjunct to control and not a substitute for it.

Winter Treatment Program

The treatment of heavily parasitized animals is essential to save the animals or improve their condition; it is also a significant step toward parasite control by removing dangerous seedbeds of pasture contamination and parasite dissemination. But, however essential, it is a measure of last resort. Prevention is worth the proverbial pound of cure. In northern climates, efficient anthelmintic medication of breeder ewes during the winter, between grazing seasons, is a reliable routine for controlling parasites. This regimen consists essentially in giving a therapeutic dose of phenothiazine (20 to 40 gm. per animal) immediately prior to each grazing season before animals are put out on clean, spring pastures. In some instances, an earlier treatment is also indicated after the close of the previous grazing season, or about a month before lambing.

This is the kernel of the so-called winter treatment program that was outlined a decade ago by the Bureau of Animal Industry, and which has given consistently good results in many areas of the United States, Canada, and other countries. Practically the same program was devised at almost the same time by Gordon in Australia, and it is interesting to note, in retrospect, that both programs were initially designed for the control of nodular worm disease. The rationale of this measure is found in the fact that many parasites, and to some extent most of them, cannot overwinter in significant numbers on idle pastures

but owe their perpetuation from season to season largely to their persistence in breeder stock during this adverse period. Consequently, efficient medication at the right time kills parasites that would otherwise contaminate spring pastures and cause inevitable trouble in spring lambs. The program of winter treatment, therefore, is a measure of systematic, preventive medication.

Free-Choice Administration of Phenothiazine

The simple, useful and popular regimen of free-choice administration of phenothiazine in salt, which is employed more widely in this country than elsewhere and often by preference or climatic necessity in lieu of the program just outlined, was devised, tested, and described by the Bureau of Animal Industry at about the same time as the latter. Its rationale had even earlier foundations in experimental work carried out both at home and abroad. In 1939, Gordon of Australia observed that larvae failed to develop in the feces of sheep for a period of four days after the animals had been given therapeutic doses of phenothiazine, and in consequence of this observation he suggested the possible advantage of incorporating this agent in a lick. In 1940, workers in the U. S. Bureau of Animal Industry demonstrated that the daily ingestion by sheep of as little as 0.5 gm. of phenothiazine prevented the development of infective larvae in the feces of treated animals; an observation that was independently confirmed a month later by Taylor and Sanderson in England.

Interestingly, even if contrary to impressions given in some accounts of this subject, the first flock tests of the method of free-choice administration of phenothiazine in salt were reported by Boughton of the Texas Agricultural Experiment Station in 1940. However, the first favorable, though qualified, reports on this method of parasite control appear to have come from the U. S. Bureau of Animal Industry in 1942. In short, the regimen consists in providing sheep flocks continuous access to a loose medicated mixture of such composition that insures, on the average, a voluntary intake of approximately 0.5 gm. of phenothiazine per animal per day. The rationale of the regimen is that this amount of drug prevents, in large measure, the development of infective parasite larvae in the feces of the medicated animals.

Trials conducted by the BAI, reported in 1942, indicated that mixtures containing one part of phenothiazine in from 9 to 14 parts of loose salt gave promise of achieving the desired result. Subsequent experience disclosed some regional preferences for mixtures of differing proportions, from 1:14 in California and 1:9 in Texas. The Bureau has favored for general use the more concentrated mixtures, namely 1:9 and 1:10, and has recognized the apparent suitability of mineral supplements as a substitute for plain salt in the mixtures, but it has also been aware that regional conditions of forage and sheep practice, combined with experience, are the logical determinants of the applicable formulations in different areas.

Anthelmintics are Adjuncts, not Substitutes for Good Management

It should be re-emphasized that the free-choice regimen, like the program of winter treatment, is also a system of preventive medication and that it is based upon a rationale wholly different from that applying to the regimen of therapeutic dosing. It also should be stated that the dominant effect of the regimen, namely, the prevention of development of infective larvae in the feces, is now known to be achieved in varying ways and to vary with different species of parasites; possibly with the same species in different hosts. For example, the egg-production of some species affecting sheep is reduced or inhibited, while the chief action in the instance of other species may be upon the embryos within the eggs or upon newly hatched larvae. There are a dozen or so hypothetical ways in which the regimen might act, but it should suffice to say that a half-dozen of these ways have already been shown to be operative in different host-parasite systems.

Of more practical concern are what might be called pitfalls of the free-choice regimen. Despite the fact that the measure has performed remarkably well, on the whole, during nearly a decade of extensive field use, it is neither foolproof nor universally applicable, and it is not a substitute for good sheep practices. Specifically, the medicated mixture must contain the only salt or mineral supplement that is available to the flock, since the success of the regimen seems to depend upon the natural salt consumption of the animals. For this reason, areas of high soil-salinity or where there is natural salt are presumably unsuited to the operation of the measure. The medicated mixture must be protected from the weather, kept loose and uncaked, and replenished as required without interruption of supply. The boxes or feeders must be ample to permit all animals in a flock to partake

at will of the mixture. Boxes or feeders should be located near the common water supply, and preferably also near any source of supplementary feeding. When the regimen is instituted, sheep must be familiarized with the nature and location of the mixture; this can be accomplished by adding to it a small amount of grain or chopped alfalfa. This may and should be done as a routine, if necessary. The program must be started on the first day that sheep are turned into spring pastures, at the beginning of the grazing season and not after pastures have become contaminated, nor as sometimes is the case, after clinical parasitism has become evident. Finally, surveillance must be exercised to detect any animals that do not take the mixture or that require therapeutic medication.

In this brief discussion of the place of medication in the control of sheep parasites, the view has been emphasized that efficient parasite control depends largely upon prevention by the employment of all possible means, including drugs, that will minimize the economic loss from parasites. Much has been omitted in order that some attention might be given to a few timely items, such as general control practices and pitfalls of free-choice medication. Veterinarians will recognize, however, that what has been said about sheep and the preventive use of phenothiazine is, in large measure, applicable also to other classes of livestock and to the use of other antiparasitic chemicals, in sheep as well as in other animals.

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The Veterinary Record, July 26, 1952, surveys some interesting, if controversial, papers that were presented at the Royal Veterinary College in London before the Association of Veterinary Teachers and Research Workers.

Discussing "sulphonamides and coccidiosis" (of chickens), Horton-Smith observed that sulfaquinoxaline, at therapeutic levels, is less toxic than other sulfonamides and may be "regarded as four times as effective" (because only one-fourth as much is required). While the author and the drug are of the highest reputation, few American workers would allow that this or any one of several anticoccidial chemicals possesses the definite superiority that these statements imply. Horton-Smith, however, properly pointed to the advantage of intermittent or continuous prophylactic medication in the rearing of birds on deep litter where isolated disease in a few chicks cannot be detected in time to prevent more serious loss.

Referring to the phenomenon of self-cure in ovine haemonchosis, Michel reported, from experiments with Trichostrongylus in rabbits, that moderate or large doses of infective larvae produce the aforementioned immune response but that small doses had a merely additive effect in so far as the infestation is concerned. The phenomenon, it was said, "acts by ejecting adult worms when the worm burden becomes too great." Admittedly, disease is caused by the operation and interaction of many factors, including, presumably, some contributory effect by the specific etiological agent, and there is ample evidence of the significance of the immunity reaction and the importance of promoting the general resistance of host animals, yet there seems to be an elementary and dangerous fallacy in the interpretation and extension of such findings as those given above. Under field conditions, exposure to haemonchosis has never been an acceptable or proved means for curing the disease. On the contrary, continued exposure of young animals has repeatedly and inevitably led to severe and precipitous death losses.

Michel's findings which closely parallel recent conclusions by Stewart in Australia and are supported in general by much work on immunity during the past 25 years, are scarcely open to question, despite the unhappy implication that modest exposure may not be sufficient to provoke immunity. One must insist, however, that the increasingly popular philosophy of cure by exposure is even less acceptable in the realm of parasitic diseases than it would be in bacterial and viral diseases. Perhaps, the situation is partially summarized in Stewart's statement that, "Sheep which died of their infestation failed to develop a positive reaction".[1]

From an epizootological study of parasitism in Scottish hill sheep which revealed, among other facts, that the time of lambing coincides with that of maximum worm burdens in the ewes, Parnell emphasized the need for an anthelmintic that could safely be given to ewes before lambing and which would remove immature, as well as mature, worms. Although these conditions cannot be fulfilled, the problem might largely be solved by treating ewes a month before lambing and removing them to spelled pastures.

Other papers of academic or historical interest dealt with verminous aneurysm of equines, anthelmintic dosing and testing, veterinary applications of BHC, and bovine venereal trichomoniasis.

[1]Stewart, D. F., *Aust. Vet. Jour.*, 24:112, 1948.

PRINCIPLES OF ANIMAL HEALTH

R. R. DYKSTRA, D.V.M.
Manhattan, Kansas

Bovine Mastitis in Great Britain

The Britisher, C. D. Wilson of Weybridge, in an address to the meeting of the Yorkshire V.M.S. during November 1951 (the address is reproduced in the September 6, 1952, issue of *The Veterinary Record*) brought out some very informative and important facts about control of bovine mastitis. Some of the information, in the opinion of the writer of this review, may be summarized as follows:

1. Infection is introduced exclusively through the teat canal.

2. The organism most frequently responsible for mastitis is *Streptococcus agalactiae*, an obligatory parasite of the udder. It does not establish itself and lives only briefly on human skin. The milker's hands doubtless carry the infection, as one method of transmission, to the teat canal.

3. Penicillin is effective in freeing the udder of *Str. agalactiae* if it is in reasonably long contact. Such contact is obtained by doses of 100,000 units per quarter daily for five days when the penicillin is in suspension in an oil-wax fluid. Larger doses are less effective.

4. Because human hands are so notoriously difficult to disinfect, Wilson is inclined to favor machine milking, provided the teat cups are disinfected, and there is no hand-stripping.

5. Milk samples are examined for *Str. agalactiae* two weeks after treatment of the animal, then every two months for a year, and finally, after two clear tests, once a year.

6. Organisms other than *Str. agalactiae* are more difficult to handle for the simple reason that *Str. uberis* and *Str. dysgalactiae* are not obligatory parasites of the udder in that they can live and multiply on the intact skin. These latter organisms are not resistant to penicillin therapy, but they may be so deeply lodged in the udder that the antibiotic does not reach them, and not being obligatory parasites, reinfection is a strong probability.

7. For summer mastitis, infusion of the dry udder with penicillin suspension appears to have value.

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Artificial insemination of cows has increased from less than 190,000 animals so bred in the United States in 1948 to more than 3,500,000 in 1951. It is one of the fastest growing projects in the dairy industry.

No Immunity to Atrophic Rhinitis

During recent times, we have been asked repeatedly whether or not an immunity is established in pigs that have apparently recovered from a mild attack of atrophic rhinitis. In the first place, we know of no such condition as a mild attack of this ailment; always there is a complete destruction of the turbinate bones as the major lesion, and there is no regeneration of these destroyed tissues. We have never heard of an immunity that protects pigs against the specifically unknown factor responsible for this ailment. It is generally conceded by practitioners that if an area is kept free from swine for three months or more, that it is reasonably safe to restock the premises.

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Hydrated lime, according to Yushok and Bear (*N. J. Agr. Exp. Sta. Bul.* 707, 1944), when used as a preservative and deodorizing agent for poultry manure also has value as a partial disinfectant. Mixed with fresh manure at the rate of 200 lb. per ton of manure, it was found to have a bactericidal effect on *Salmonella pullorum, Sal. typhimurium, Sal. gallinarum,* and *Pasteurella multocida* in a 15-minute period. Similarly it prevented the sporulation of coccidial oocysts, and the segmentation and embryonation of *Ascaridia lineata* eggs. Another advantage of this use pointed out by these investigators is that the treated manure is unattractive to flies and rodents. Fly maggots are not produced in the treated dropping pits, and both mice and rats avoid them.

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Current medical literature indicates that physicians do not have the reliable, comparatively simple tests for brucellosis possessed by veterinarians. The only absolutely positive human test is the recovery of the Brucella organism from the tissues. The skin test is not reliable, and the complement fixation and opsonocytophagic tests are too complicated. If there were available to physicians a standardized reliable antigen (this is available to veterinarians in the stable, smooth culture, Brucella strain of the Bureau of Animal Industry), the agglutination test could be as reliable as it is for animals.

PUBLIC HEALTH

JAMES H. STEELE, D.V.M., M.P.H.
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Raw Garbage Feeding

At the American Public Health Association convention in Cleveland, Ohio, October 20-24, 1952, Dr. Brock Chisholm, director of the World Health Organization (WHO), delivered an address on world health problems. In this, he referred to the common practice in the United States of feeding raw garbage to swine. He pointed out that in no other known country in the world is the incidence of trichinosis as large as here. Infection is maintained in the hog population because of feeding raw garbage. Doctor Chisholm also pointed out that this revelation is always a shock to foreign visitors who come here to study public health practices.

Since 1939, the U. S. Public Health Service has been interested in trichinosis control. This interest was stimulated because of the important work of Dr. Willard Wright, Dr. M. C. Hall, and associates, of the National Institutes of Health, who revealed in their studies that about one out of every six persons has evidence of trichinosis infection. Further studies have indicated that about 5% of infected persons have heavy parasitic infection. On the basis of these figures, it is calculated that there should be in excess of 15,000 new cases of human trichinosis annually. The reporting of this disease is very spotty in the United States. Although 44 states list it as reportable, most cases are reported in only a few states. It is the opinion of public health authorities that failure to report these findings is largely due to lack of a positive diagnosis.

In order to prevent the spread of trichinosis in the United States, the Public Health Service promulgated Interstate Quarantine Regulations in 1941, to prevent the feeding of raw garbage that moved interstate. According to these regulations, all garbage that moves from one state to another must be heated for 30 minutes at 212 F. before being fed to swine. It is understood that this regulation has not been enforced in some instances, notably in the East. At the time this Interstate Quarantine Regulation was adopted, the Public Health Service also was interested in persuading state and territorial authorities to adopt similar laws to control the intrastate movement of kitchen wastes. To date, six states and the Territory of Hawaii have laws or regulations prohibiting the feeding of raw garbage to swine. Most successful of these programs is that now in operation in Hawaii. A recent survey by the Public Health Service has revealed that the intrastate movement of garbage was a much larger problem than the interstate movement, and that if any effective garbage-cooking program was to be instituted, it must be done by state authorities.

Garbage-cooking regulations are of value not only in trichinosis control, but they also prevent other communicable diseases from being spread among swine. In the past, there have been reports of outbreaks of tuberculosis and salmonellosis that were attributed to raw garbage. It is thought by many that the diseases of economic importance that could be controlled through garbage cooking, would be of even greater importance than the public health advantages. It is well known that hog cholera is spread through the feeding of raw garbage. During World War II, there were many examples of hog cholera outbreaks in foreign countries that were traced to garbage from Army installations where American pork was served. Fortunately, these were all brought under control by eliminating the practice of raw garbage feeding or prohibiting garbage feeding.

In recent months, a serious outbreak of vesicular exanthema has spread to 27 states from California, where it was first identified in 1932. In the opinion of the California veterinarians and livestock sanitary authorities this disease cannot be controlled or eradicated until the practice of raw garbage feeding to swine is discontinued. Most of the outbreaks during the summer and fall of 1952 have occurred in garbage-fed pigs. It is the consensus of livestock sanitary authorities and veterinarians that the feeding of raw garbage to swine must be stopped if vesicular exanthema is to be controlled and eventually eradicated. At the recent convention of the U. S. Livestock Sanitary Association, a resolution was adopted setting forth this principle.

Great Britain has developed a national garbage-cooking program for the control of swine diseases. In recent years, Great Britain has had a number of outbreaks of foot-and-mouth disease, which were traced to meat scraps that appeared in garbage that was fed raw to swine. During World War II, there was developed a garbage cooking program to

(Continued on page 42)

POULTRY PRACTICE PROBLEMS

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Buy Only Pullorum Disease-free Chicks and Poults

Each year at the beginning of the major hatching season for chicks and poults the writer likes to remind readers that their clients should be advised to buy chicks and poults only from hatcheries that can assure them that the chicks and poults have been hatched from eggs laid by pullorum disease-free flocks. The only safe way to insure freedom from this disease is to buy replacements from hatcheries that are accredited to sell U. S. Pullorum-Passed or U. S. Pullorum-Clean poults and chicks.

One other grade, U. S. Pullorum-Controlled, is also available. It is an inferior grade and should not be recommended because it does not guarantee freedom from the disease. The U. S. Pullorum-Controlled grade only stipulates that the flocks so graded have been tested, less than 2% reactors found, and that these reactors have been removed from the flock and sold. This grade actually assures the prospective buyer that he will get chicks or poults from flocks that have been proved to be infected. It is encouraging that at the last National Poultry and Turkey Improvement Plans Conference held in Dallas, Tex., in June 1952, the Conference went on record as favoring the elimination of the Controlled grade as soon as possible. The U. S. Pullorum-Tested grade was eliminated from the program in 1949. Immediate elimination of the Controlled grade would do much to aid eradication of pullorum disease from the United States.

There are plenty of hatcheries that handle only the two top grades, U. S. Pullorum-Passed and U. S. Pullorum-Clean. In fact, according to the 1951-52 report of the U. S. Poultry Improvement Plans Conference, 81.54% of all the participating chicken hatcheries had either Passed or Clean ratings. This in contrast to 36.15% in 1947-48. An even higher per cent of the turkey hatcheries (86.67%) had these ratings in 1951-52. A total of 90.55% of the chickens and 97.54% of the turkeys tested in 1951-52 were in flocks having the superior ratings. If there are no such hatcheries in your community, suggest that each of your interested clients obtain a list of available ones in the area from the county agent's office. Better yet, keep a supply of the lists in your office.

If you have a local hatcheryman who still sells the Controlled grade, you will be doing both him and the community a favor by advising him on the best procedures to follow to eliminate pullorum disease from his supply flocks. His best method would be to see that all producers of hatching eggs obtain their replacements from pullorum disease-free sources, even if they have to buy them from a competitor. He should then eliminate every flock that is found to have reactors in it. In many instances, a hatchery has the majority of its supply flocks free of the disease, but because of a few that have reactors in them, the hatchery has to be given a Controlled rating. By eliminating the few diseased flocks and replacing them with disease-free flocks he could accomplish his purpose in one, or at the most, two years. One infected supply flock makes the entire egg supply for the hatchery vulnerable to the disease when its eggs are exposed in the hatchery to the eggs from the diseased flock.

I do not like boycotting but do not have any sympathy for the hatcheryman that still tolerates pullorum disease in his supply flocks, and strongly advise you to urge prospective buyers of poults or chicks to by-pass U. S. Pullorum-Controlled hatcheries. It is poor business to buy chicks or poults from such hatcheries.

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In 1944 Gwatkin and Mitchell (*Canad. Jour. Pub. Hlth.*, 35:281, 1944) showed that houseflies were capable of infecting day-old chicks after being allowed to feed on chicks that died of pullorum disease or material infected with *Salmonella pullorum*. *S. pullorum* was recovered from the feet and wings of flies immediately after exposure and six hours later. It was recovered from the gastrointestinal tract of infected flies for at least five days after infection.

In a new series of experiments Gwatkin and Dzenis (*Canad. Jour. Comp. Med.*, 16:149, 1952) have explored the possibility of infected blowflies and houseflies transmitting *S. pullorum* to their eggs and subsequently to their progeny. The results of these experiments were negative. The authors conclude that flies may act as carriers of pullorum disease for an undetermined length of time but apparently do not transmit it to a second generation.

Successful Treatment of Ascites in a Dog

WILLIAM V. LUMB,* D.V.M., St. Paul, Minnesota

Ascites in the dog is usually a discouraging problem for the practitioner. Most animals so affected are aged and collection of fluids in the abdominal cavity is the culmination of frequent or prolonged liver insult. Anemia and hypoproteinemia are usually coexistent. Abdomenocentesis is a palliative measure which at best prolongs the patient's life without changing the basic nature of the condition. Recently Greene and Hoerlein[1] discussed a regimen of treatment for these cases consisting of diuretics and dietary changes. The following report is illustrative of the response which sometimes occurs.

On February 13, 1952 a male collie, age four years, was brought to the small animal clinic, A. & M. College of Texas. The owner stated the dog had appeared ill during the latter part of December 1951. Following a dose of castor oil appetite had improved somewhat but remained poor and the abdomen gradually enlarged. The owner stated, that two weeks prior to entry "He looked as though he would burst." A local veterinarian in attendance performed an abdomenocentesis and, according to the owner, four to five gallons of fluid were removed. The owner was advised at this time to take the dog to the Veterinary Hospital, A. & M. College, but was unable to do so. In three days, the abdominal distention was again quite apparent and caused the animal considerable distress. Abdomenocentesis was again performed. Three days later the dog was presented at the clinic.

On examination temperature was noted to be 100 F. Patient was thin, had pale mucous membranes and a greatly distended abdomen. No abnormal heart sounds could be detected and there was no visible edema. Blood and urine samples were taken for laboratory examination and the patient was hospitalized. A poor prognosis was given the owner.

Laboratory examination of the blood and urine revealed the following:

Blood	
WBC	11,700
Differential	
Segmented	52%
Lymphocytes	29%
Eosinophiles	19%
RBC	3,890,000
Microfilaria	negative
Urea nitrogen	9.5 mg./%
Urine	
Sp. gr.	1.015
pH	7
Albumin	negative
Sugar	negative
Indican	negative
Microscopic	few RBC

Fecal examination was negative.

The following day, 250 cc. of whole blood were given intravenously. Oral medication, consisting of 1 gm. of theocalcin† and 0.25 gm. of decholin†† three times daily.

Three days later the patient was discharged. No discernible change had occurred except that appetite had improved. Theocalin and decholin were dispensed to the owner with instructions to continue the treatment which had been started. A high protein diet was prescribed. On discharge the patient's weight was 45 lb.

The dog was returned for examination ten days later. A marked change had taken place. Appearance was bright and alert; no abdominal distention was observed. Though the animal appeared to have gained flesh, weight was only 41 lb. The owner was extremely pleased and stated that the dog was doing fine but was more nervous than usual.

A two weeks' supply of decholin and theocalcin tablets was dispensed with instructions to decrease the dosage gradually provided the dog remained asymptomatic. A communication from the owner a month later stated the patient was doing well without treatment. At this writing, August 1952, the dog has had no further medication and has apparently made a complete recovery.

REFERENCE

1. Greene, J. E., and Hoerlein, B. F., Diagnosis and Treatment of Canine Hepatosis. *N. Am. Vet.*, 32:166, 1951.

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The syndrome observed in air sac infection in poultry cannot be produced experimentally.

*Doctor Lumb was formerly associate professor of veterinary medicine and surgery, Texas A. & M. College. He is currently doing graduate study at the University of Minnesota.

†Theocalcin (Bilhuber-Knoll Corp., Orange, N. J.) is theobromine-calcium salicylate, a xanthine diuretic and heart muscle stimulant.

††Decholin (Ames Company, Inc., Elkhart, Ind.) is dehydrocholic acid, reported to be diuretic in hepatic cirrhosis and to potentiate the clinical diuretic response to mercurial diuretics.

An Improved Technic of Fecal Examination

ANTHONY MILAKNIS, D.V.M., Chicago, Illinois

It has been said that accurate diagnosis is half of treatment. Indeed, every veterinarian is seeking the easiest and best method of arriving at an accurate diagnosis. The method of fecal examination employed at our hospital has given favorable results. This method is not radically different from many existing technics, but it presents some features that appear desirable.

Equipment

Equipment necessary is that used by most veterinarians, with the addition of several Erlenmeyer flasks (50 ml.) and a bacteriologic loop with a 5 mm. diameter.

Procedure

An adequate stool specimen of approximately 15 gm. is placed in a waxed paper cup or beaker, and a small quantity of the flotation media of choice added. Media may be appropriate strengths of sodium nitrate, sodium chloride, sugar solution, etc. The mixture is then stirred until homogenous. Fifty to 60 ml. of the media are added to this mixture and stirred. This is then poured through the strainer into the Erlenmeyer flask, by use of a funnel. The flask is filled carefully, perhaps stirring the contents in the strainer. Formation of air bubbles should be avoided because they may obscure ova. Overfilling the flask will flood ova away. Strainer and funnel should be cleaned immediately in running hot water.

The fecal mixture is let stand for at least five minutes. The loop is then poised over the mixture in the flask and the meniscus gently cut, removed, and deposited on a microscope slide in horizontal position. For greater accuracy, three drops or more should be transferred from different areas of the suspension surface in the flask. Drops may be placed on the same slide. Loop should be flushed in running hot water or sterilized in a flame.

Examination can then be made under the low power objective. If more detail is necessary, a cover glass should be placed over the drop, and high power used.

Advantages of the Method

The Erlenmeyer flask presents the first advantage. This is its holding capacity in relation to its mouth area. A vial or test tube has less capacity with approximately the same mouth area. A larger fecal sample can thus be utilized in the flask and the concentration of the ova will be correspondingly greater. The 50 ml. flask has about five times the capacity of the ordinary test tube or vial.

The loop-transfer is the second advantage. The loop facilitates transfer of the mixture and any contained ova or oocysts from the flask to the slide. A single drop is the diagnostic area that must be examined, not a total slide. A definite portion of the flask-meniscus is removed, and since the meniscus of the drop is upward, ova will flood to its height. They will tend to concentrate in a single microscopic field.

A stick or glass rod offer the obvious transfer disadvantages. Only a small portion of the mixture can be transferred, and many ova may be lost in the process; some may adhere to the rod or stick.

If the method of placing a slide on top of an overfilled container is used, with the purpose of collecting ova on the underside, tidal waves resulting from removal of the slide to the microscope stage may be sufficient to lose many ova. Also, the diagnostic field is extensive.

In our hands, a technic of fecal examination consisting of cutting the surface of a fecal mixture with a loop, and transferring the representative drop to a slide for examination has been effective.

* From an address presented at the regular monthly meeting of the Chicago Veterinary Medical Association, Oct. 14, 1952.

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No Water

G. M. MERRIMAN, D.V.M., Carsonville, Michigan

A hunter of African big game once said that the earned but not collected trophy was the one that remained in memory. Likewise, perhaps, it is the diagnosis "that almost got away" which lingers as an unforgettable memento. The following case history is illustrative of that point.

On a winter morning, the writer had just finished treating a mastitis case when the farmer presented another cow. This six-year-old Holstein had been bred five months earlier. The owner stated that on the morning before this visit he had suspected the cow was in heat.

"She was bellowing and pulling at her stanchion," he remarked. "I don't turn them out every day, but I let this cow and another one out yesterday to see if she really was in heat. They didn't ride each other, so I put them back in."

During the rest of that first day, the owner noticed the cow displaying the same signs of restlessness. On the second morning, the day the writer first saw her, she bellowed more than usual, was down a little in milk, but ate her feed and acted normally otherwise.

Examination disclosed no sign of estrum. Rectal examination proved her to be five months' pregnant. She stood quietly and chewed her cud during the examination. It was suggested that she had experienced a false heat period.

The cow's owner was encountered in town the next day. "That cow," he observed, "is bellowing again this morning, but she eats all right. She was off a little in milk today."

He was instructed to watch her closely and advise if there were any changes.

Upon returning home that evening, a message was waiting from the client that his cow was much worse. A hurried trip was made since it was apparent that something had been overlooked in the diagnosis of the previous day.

It was now some 60 hours since the owner had first thought the cow was in heat. She now displayed marked irritation, would lunge frequently toward the animal on either side of her, with mouth open and tongue extended. When not lunging sideways, she would pull so hard against her stanchion that the whole row of stanchions would rattle. Bellowing was nearly constant and extremely hoarse.

The owner tried, with little success, to quiet the animal during the examination. Temperature was 101.8 F. The rumen appeared to be shrunken, and contractions, while present, were weak and infrequent. Urine test was negative for acetone bodies. Most of her feed had been eaten that evening.

No diagnosis was made at this point. The owner, who had some years ago lost a horse from rabies, seemed prepared for the warning that this cow might be a victim of that disease. The writer helped him prepare a strong-walled box stall where she could be kept while awaiting further developments.

It was planned to drop a heavy halter over the cow's head and work her into the box stall with the least possible excitement. She lunged so wildly at the farmer when he tried to get the halter on her that the writer crawled up in the manger to lend him a hand. Not until this time was attention given to the drinking cup. The cup was so placed that only the one cow ever drank from it. And it appeared to be bone dry. The drinking paddle was pushed—no water.

"How long has her water been off?" the writer asked.

"It isn't off, is it?" the owner asked in turn.

The dairyman was assured that the cup was not operating, and he went running for a wrench. The instant that the cup began to function again, the water-starved animal jammed her nose into the bowl. The diagnosis was promptly changed, not in the prettiest of technical language, to dehydration.

The cow was allowed only limited water during the night. In the morning when she was allowed free access to the cup, mild bloat occurred. Tympany rapidly subsided and the patient recovered quickly from the horrible ordeal of a water famine that had lasted well over 60 hours.

Her owner has not recovered, however. He is a farmer unusually kind to his stock. The thought that he accidentally caused his cow so much agony bothers him yet.

The writer still shudders at a near-miss on this particular diagnosis. Perhaps the lack of a rise in temperature, a factor present in other cases of dehydration observed, complicated the picture.

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Raw Garbage Feeding

(Continued from page 38)

prevent outbreaks of foot-and-mouth disease, hog cholera, and other diseases that could have been introduced from food coming from foreign countries. This program has been successful. No doubt, if foot-and-mouth disease ever occurred in the United States, action would be taken to prevent the feeding of garbage to swine.

The importance of garbage-borne disease to public health and animal health provides an excellent opportunity for veterinary medicine to exercise leadership in the promulgation and adoption of such laws and regulations by state and local authorities. The importance of this problem has been recognized by the American Veterinary Medical Association, the American Medical Association, the Public Health Service, and other interested groups which sponsored a two-day National Trichinosis Conference in Chicago, December 15-16, 1952. Proceedings of this conference will be mimeographed and distributed to all state, public health, and livestock sanitary authorities interested in the control of garbage-borne diseases.

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It is estimated that vesicular exanthema has spread to over 80,000 swine in New Jersey.